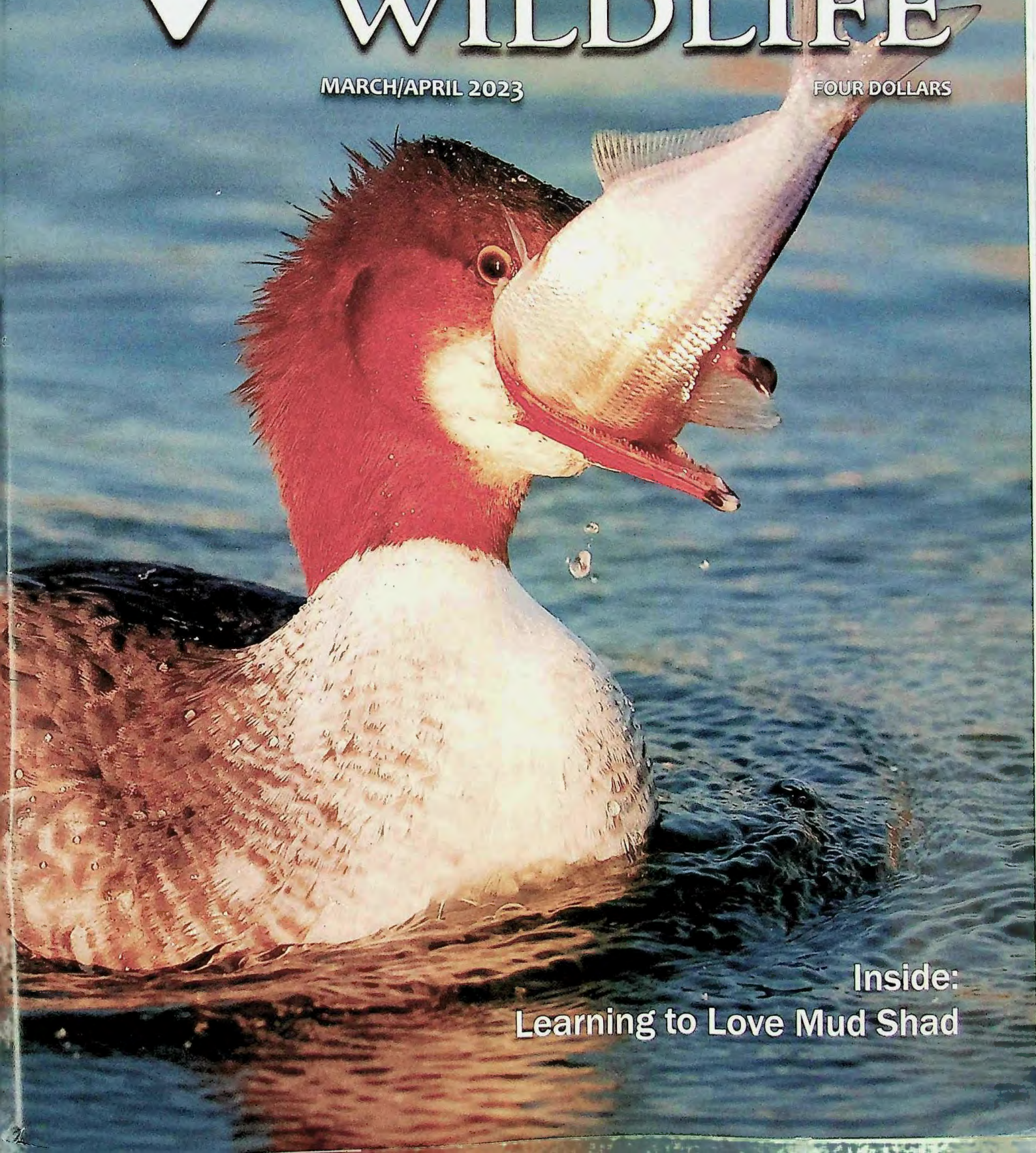


VIRGINIA WILDLIFE

MARCH/APRIL 2023

FOUR DOLLARS



Inside:
Learning to Love Mud Shad





VIRGINIA WILDLIFE

MARCH/APRIL 2023

VOL. 84, NO. 2

FEATURES

6 Learning to Love Mud Shad

By John Page Williams

Anglers don't see much of this unassuming fish species, but they play a critical role for Virginia's sport-fisheries.

12 Let the Rivers Flow

By Louise Finger/DWR

Removing dams from Virginia's waterways restores them to healthy habitat for aquatic wildlife.

16 Golden Oldies—Five Classic Lures Your Grandfather Used That Still Work

By Gerald Almy

Anglers are always looking out for the next best thing, but classic lures designed decades ago still do the trick.

22 Know Before You Go Boating

By Ron Messina/DWR

Being aware of what weather is on the way can help make your day of boating safer.

28 Finding Fish in Urban Northern Virginia

By Gregg Rockett

Don't let views of a highway stop you—urban fishing in Northern Virginia is surprisingly productive.

34 Finding Ecological Answers and Educating at The Clifton Institute

By Glenda Booth

This northern Virginia nonprofit seeks to inspire the next generation of environmental stewards, restore habitat, and conserve biodiversity.

DEPARTMENTS

5 From Our Readers • 20 Explore the Wild • 32 Working for Wildlife
39 On the Water • 40 Photo Tips • 41 A Walk in the Woods
42 Living Habitats • 43 Fare Game • 44 Good Reads • 45 Out & About
46 How You can Help Wildlife

Cover: A female hooded merganser prepares to swallow a gizzard shad, see page 6. ©David Stimac

Left: The Clifton Institute teaches environmental awareness to all ages, see page 34.

Courtesy of The Clifton Institute

Back cover: A scenic view of the New River, page 12. Meghan Marchetti/DWR



RYAN J. BROWN
Executive Director

There's a quote from Ben Franklin that says, "When the well is dry, we know the worth of water." Water seems ubiquitous—it flows down our rivers, falls from the sky, and crashes onto our beaches. As Franklin suggests, we tend to take water for granted. But the well running dry isn't the only peril facing our water supply; even if water is flowing, it's not necessarily *clean* water. And for many wildlife species, clean water is key.

There's no question that clean water is essential not only for aquatic wildlife, but for all species of wildlife. Aquatic wildlife such as fish, crayfish, mussels, Eastern hellbenders, and so many more require healthy aquatic habitat to thrive. Terrestrial wildlife (those creatures living on land) depend on water both for food sources and as

drinking water. We humans rely on clean water for both survival and recreation. It's impossible to overstate just how important clean water is.

Last year marked the 50-year anniversary of the Clean Water Act (CWA) of 1972, a landmark piece of legislation that's still having positive effects on our waterways and wildlife today. By regulating pollutant discharges into U.S. waters—allowing the Environmental Protection Agency (EPA) to implement pollution control programs—and funding restoration projects, the CWA and other federal and state regulations have paved the way for improvement of waterways across Virginia. We've seen the Atlantic sturgeon return to the James River system and have successfully propagated imperiled species of freshwater mussels thanks to cleaner waters.

All of wildlife is connected by a web of interdependency, as illustrated by John Page Williams' article on page 6, "Learning to Love Mud Shad." Mud shad, or gizzard shad, isn't a species that's prized by anglers as a trophy. They're not flashy or beautiful, but they're integral to the food chain in our rivers, feeding those species that grow into trophy fish. Clean water and healthy aquatic habitats make that network possible.

We talk a lot about our work improving habitat for terrestrial wildlife, but it's important to note that as an agency, DWR is also dedicated to improving healthy aquatic habitats for the species that live in our rivers, streams, and lakes. Louise Finger, DWR's stream restoration biologist, has been enormously effective in projects that have conserved aquatic ecosystems for a myriad of game and non-game species. Louise has worked on in-stream habitat restoration, riparian restoration, dam removal, and alteration of stream crossing to improve fish passage, all with the support of essential cooperative partnerships that she fostered. Some of the projects she accomplished include the largest single stream-channel design project ever completed in Virginia on the Maury River, the installation of more than 45 stream habitat/channel structures on the North River, and the removal of Jordan's Point Dam on the Maury River. She was named DWR's Aquatic Biologist of the Year in 2020.

Louise's article on dam removal on page 12, "Let the Rivers Flow," highlights some of the work done by DWR that's not only improving habitat and water quality for a wide variety of aquatic species, but also benefitting terrestrial species and humans. As an agency, we'll continue to work on clean water and healthy aquatic habitats, because wildlife knows the worth of water.



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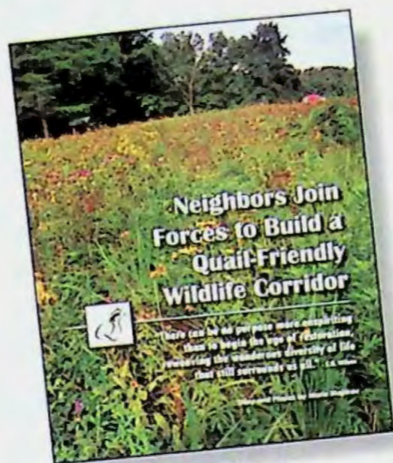
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Dear Editor,
I enjoyed reading [Marie Majarov's article] "Restoring the Wild with a Quail-Friendly Wildlife Corridor" in the November/December 2022 issue of *Virginia Wildlife*. We miss the quail here in central Virginia that we hunted over 50 years ago and hopefully the Quail Recovery Initiative (QRI) will soon restore and sustain the Northern bobwhite. And we applaud the landowners contributing their time and resources to provide the necessary food plots.

But in reading your report, I noticed one vital plant was missing from the seed mix used in the plots that were highlighted. In my experience over 80 years, I find that lespedeza is a favorite food for bobwhites and is an essential food to maintain their population. This is endorsed in the Virginia Department of Wildlife Resources (DWR) article "Feeding Cover Management" [on the DWR website section Managing Your Land for Bobwhites] correctly referenced in your article.

As you and others do the good work to advance the QRI, I encourage you to include lespedeza in your seed mix recommendations. Thank you to

consider this input and to share with your colleagues at DWR, Virginia Tech, and the participating landowners.

Respectfully,
Bill Sweeney, Lynchburg

Dear Mr. Sweeney,
As a lifelong quail hunter, I sympathize with your sentiment about Korean and Kobe lespedeza. These are the plants I think you referred to in your letter as "lespedeza." The first, Korean, lespedeza stipulacea and the second is Kobe (pronounced "koh-bay" and Kobe, Japan) lespedeza striata. These species were planted extensively over 70 years ago as hay. In fact, they were sometimes called "poor man's alfalfa."

Quail hunters often found quail feeding in lespedeza patches and soon began to feel their favorite birds couldn't live without it. But food habits studies and crop examination reveal a far more complex story. Studies done in Virginia during that time revealed that common ragweed seed was the number one food source in November, making up 30 percent of their diet, and even in January, ragweed made up nearly 10 percent of their food intake.

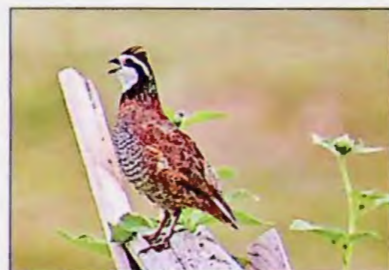
Quail in their current form have existed on our landscape for thousands of years... long before non-native lespedezas were planted. Like many other wild animals, they rely on a diverse, rich plant community consisting of native forbs, legumes, and wildflowers, which not only provide multiple reliable seed sources, but make great summer bugging habitat—and insects dominate the quail's diet during the warm months. In our modern world, we now try to maximize native

plants like partridge pea, ragweed, slender lespedeza, beggar-weeds, poke weed, and many more. And in all honesty, if a person learns to identify plants that naturally respond to soil disturbance like fire, light disking, or even properly managed cattle grazing, they may find they do not have to plant anything for wildlife.

Thank you for this chance to expound a little on the value of native plants and for your passion for the bobwhite quail.

Sincerely, Marc Puckett,
DWR Small Game Project Leader

On Our Website...



Northern Bobwhite Quail

If you're interested in Northern bobwhite quail and their habitats, there's quite a bit of information on the DWR website, including links to learn about the species, managing your land for bobwhites, getting involved in habitat management, and hunting for quail in Virginia. virginiawildlife.gov/quail

We want to hear from you! We welcome letters to the editor, questions for our staff, photos you capture of wildlife, and experiences you want to share. Please include your name and address when you send correspondence to editor@dwr.virginia.gov via email or by mail to Editor, Virginia Wildlife, P.O. Box 90778, Henrico, VA 23228-0778. Correspondence chosen for publication may be edited for clarity and/or length.

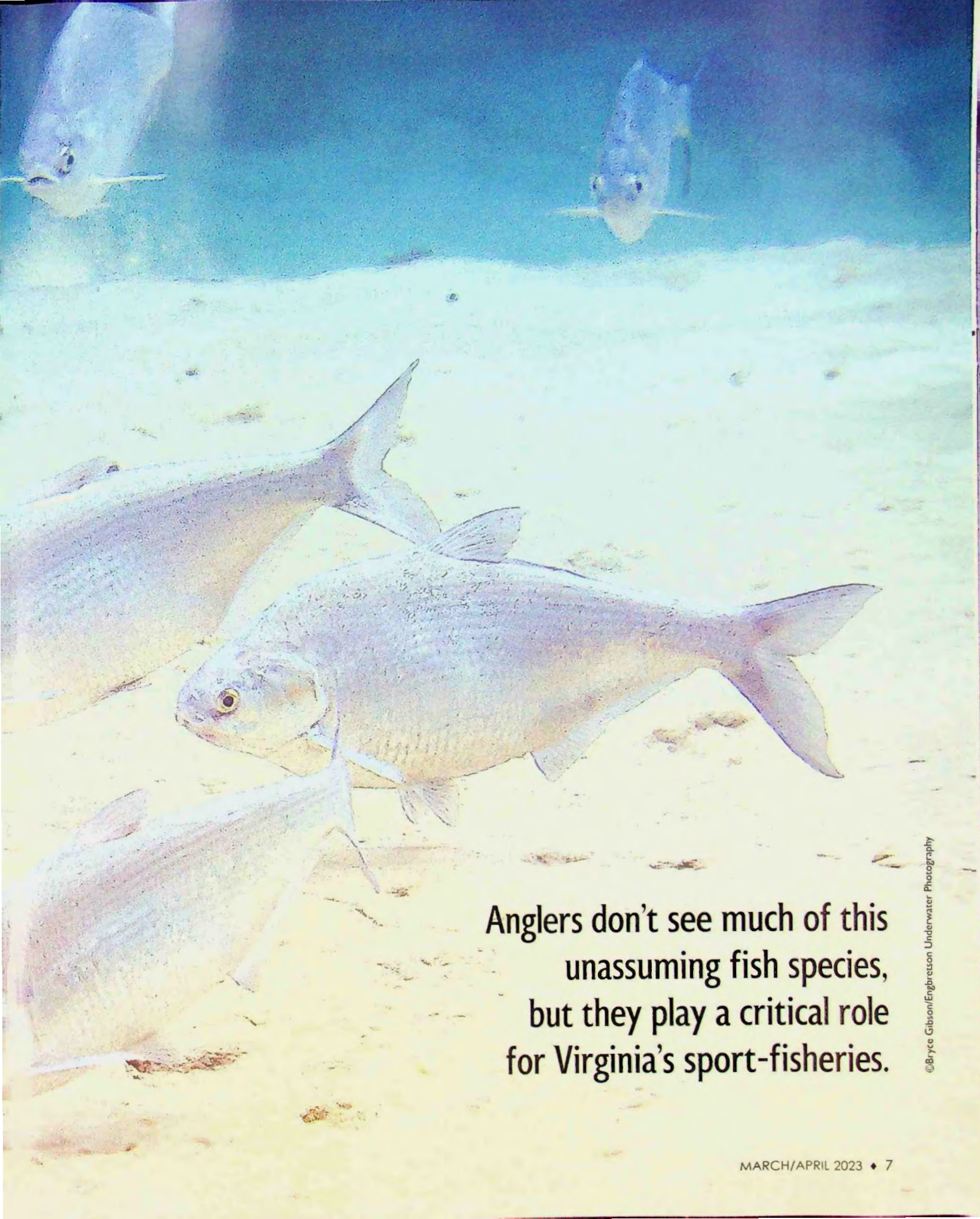
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Learning to Love Mud Shad

By John Page Williams



Anglers don't see much of this
unassuming fish species,
but they play a critical role
for Virginia's sport-fisheries.

©Bryce Gibson/Engbretson Underwater Photography



"The young are extremely different from the adult, slender and minnowlike in shape, and with a row of fine teeth on upper jaw, although the mouth of the adult is entirely toothless and smooth. The internal structure of the young also differs remarkably from that of the full-grown fish, especially in the much greater simplicity of the digestive apparatus, the intestine in specimens not more than an inch long passing almost directly back from the stomach to the vent."

The young fish prey primarily on live zooplankton, especially tiny shrimp-like crustaceans called copepods, which they can digest and absorb quickly.

Individual young gizzard shad also characteristically carry a single dark spot on each shoulder, with the typical baitfish countershading pattern of an iridescent gray back, silvery flanks, and a light gray belly.

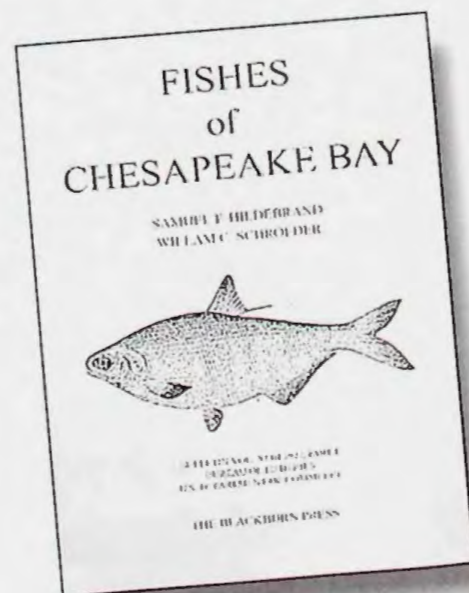
It's no accident that if you look at a picture of a standard bass angler's crankbait, say a two-inch Rapala Shad Rap in shad color, you'll be looking at a dead-ringer for a two-inch gizzard shad, spot and all.

Nobody loves mud shad. They're too bony and oily for our taste, and they won't take a fly, lure, or bait. So what good are they? Basically, they're food for other fish. From a human point of view, they fall into that catch-all category of forage, but they still don't get the respect that menhaden and bay anchovies do.

Even so, mud shad (a.k.a. gizzard shad, *Dorosoma cepedianum*) fill a critical niche: they serve as primary forage in Virginia's upper tidal rivers and numerous impoundments, both large and small. "Growth rates vary from river to river, depending on what food is available there, but they form an important link in the food chain, and not just for large-mouth bass and blue catfish," said Virginia Department of Wildlife Resources

(DWR) Tidal Rivers Fisheries Biologist Margi Whitmore. "They also, at their various life stages, feed crappie (both black and white), white perch, yellow [ring] perch, gars, bowfin, hickory shad, striped bass when they are up the rivers, and other native fish. Having a debris feeder in these rivers is really important."

Why They're "Gizzard" Shad
"Debris feeder?" Oh, yes, they don't get called "mud shad" for nothing. The adults' small, underslung mouths are designed for scooping bottom sediments as well as inhaling plankton drifting in surface waters. See this description contrasting young fish from adults in the classic 1927 reference book *Fishes of Chesapeake Bay* by Samuel F. Hildebrand and William C. Schroeder:



Above: Adult gizzard shad, Lynda Richardson/DWR. Below: Young gizzard shad, Courtesy of USGS

The adults, though, shift to a very different lifestyle. Hildebrand and Schroeder have more to say:

"The [adult's] food consists almost exclusively of small organisms derived from mud, upon which it feeds. For the purpose of extracting these organisms from the mud, the fish is provided with a very effective straining apparatus in its gillrakers... Linton examined 10 stomachs taken from Chesapeake Bay specimens and found about 20 percent of the 'gizzard' content to consist of sand and mud and about 80 percent of vegetable debris... The intestine in this lot contained the same material, but with a rather larger proportion of sand."

That doesn't sound like a very appetizing or nutritious diet, does it? However, from the mud shad's perspective, the quantity of "debris" available on the bottom of our tidal rivers is unimaginably huge, so it represents a vast food source for any fish adapted to tap into it. Hildebrand and Schroeder explain:

"The adults also are characterized by the numerous, slender, close-set gill rakers, by the greatly thickened walls of the stomach, from which it derives the name 'gizzard shad,' and by the long convoluted intestine and numerous coeca."

The filamentous gill rakers act as sieves to catch minute bits and scraps of dead plant and animal material—any debris with some caloric value, also referred to as detritus—that passes through the mud shads' mouths. Their muscular gizzards grind the material into smaller bits, assisted by the sharp grains of sand, and pass them into the winding intestine (which can be as long as four times the length of the fish) and its coeca (pouches), which absorb what's nutritious while allowing the inorganic sand and mud to pass through.

Studies have shown them to "eat" as much as 13 percent of their body weight each day, though that percentage will vary with location even in the same river

system, and some of it, e.g., the sand and mud, simply passes through undigested.

Turning Detritus into Sport Fish

These specializations allow this "plastic" fish to thrive in a wide range of environments, where it builds a nutritious forage base for crappie, bass, blue cats, and others. As DWR's Fisheries Chief Dr. Mike Bednarski likes to say, mud shad "package zooplankton and detritus into nice, tasty morsels for us" by feeding the Virginia species we like to eat. They form a short, biologically efficient link in our waterways' food webs that directly connects basic plant life with larger fish, including the ones we care most about.

Mud shad spawn together in open water from about the middle of March to late August, beginning when the water temperature rises to 50° F. The sticky eggs fall to the bottom, often covering underwater vegetation and woody debris. The young grow fast during the summer and mature in their second or third year. This manner of spawning does not compete with that of other fishes.

The species' life span averages five to seven years, with a maximum of 10. Adult length averages 10"-11" but can range to 20" and a weight of more than three pounds. That fast growth is part of this shad's strategy to avoid being eaten, though in rivers like the James, even a large mud shad makes a good meal for

a big blue cat. Largemouth bass of three to five pounds in our tidal rivers are perfectly capable of eating six- to eight-inch, 2-year-old mud shad. Hence Virginia anglers' common use of similarly sized hard and soft swimbaits. "Large-mouth bass are pretty bold," Bednarski noted.

By the way, while mud shad don't strike our lures, every once in a while a lure meant for another species will snag an adult, generally at the base of the dorsal fin. The resulting fight can be exciting, with the fish aggressively pulling drag on powerful runs. There's



Many bass lures mimic the appearance of the gizzard shad.

©Eric Engbretson Underwater Photography



Common mergansers fight over a gizzard shad.

nothing sluggish about a mud shad in that situation.

As forage, mud shad feed most of Virginia's predator fish species in both impounded and tidal waters, including (in addition to those cited earlier) white bass, walleyes, sauger, saugeyes, channel and flathead catfish, freshwater drum, chain pickerel, northern pike, and muskellunge. Whenever dead or sick mud shad float to the surface, bald eagles and ospreys happily pick them off. When they wash up on shore, they feed crows and turkey vultures. Small mud shad feed river otters, our various herons, and waterfowl like mergansers.

Food for Other Fish

Beside the mud shad's considerable value as forage, the species does have some commercial value. To catch bait for catfish, Capt. Mike Ostrander of Discover the James gets to the river before sunrise most mornings when he has tours scheduled. He fishes for mud shad with a fast-sinking cast net (eight-foot radius, heavy weighted, with



A gizzard shad caught in an anchored gill net in the James River near Richmond.

Just How Many Gizzard Shad Are There in Virginia Rivers?

By Alan Weaver, DWR Fish Passage Coordinator

Well, it is quite a lot. While we do not have actual gizzard shad, or mud shad, population estimates across Virginia, we do have a really good idea of how many migrate upstream each spring on the James and Chickahominy rivers. At least 30 species of fish, including American shad and gizzard shad, use the Bosher's Dam vertical slot fishway on the James River. We do post-season review of digital video collected at the counting window. Random quarter-hour segments of every hour of video are subsampled and the results are multiplied by four to generate count estimates. Over 23 years (1999 to 2021), more than two million gizzard shad passed through the Bosher's

fishway with an annual average of 89,778. The record hourly passage rate is just over 4,200!

At Walker's Dam on the Chickahominy River, we collect passage data using an electronic fish counter. Fish exiting this double denil fishway pass through one of the eight five-inch-diameter PVC tunnels inserted in each of the exit channels. Each tunnel is equipped with three equally spaced electrodes, which are wired to a counting device on the deck of the fishway. When a fish passes through this array, disrupting the potentiometric bridge between the electrodes, an additional count is added to that tunnel. Species composition of the count is determined by frequent exit channel trapping throughout the migration season.

We track several species at Walker's, including gizzard shad, alewife, blueback herring, and American shad. Over 822,000 gizzard shad passed through the Walker's fishway from 2018 to 2022 with an annual average of 164,439. The max daily passage of gizzard shad on record is 36,176! Not every river has the same density of gizzard shad, but the migration information collected by studying spring passage on the James and Chickahominy gives us a good idea of just how many gizzard shad there are in similar river reaches across their range in the Commonwealth.



Alan Weaver/DWR

one-inch mesh) and an anchored gill net (100' long, four-inch stretched mesh, on a recreational license). He sets them on flats, perpendicular to shore, from four to eight feet out to 16' to 25', depending on water temperature. He looks for 12"-18" fish and chunks them for bait.

Chuck Fredericksen of Hopewell, a retired James River Association Riverkeeper and longtime riverman, catches mud shad in his gill nets to sell to local tackle shops for catfish bait, especially in the spring of the year when shops are loading freezers. He has also been known to bait a few crab pots himself and to sell the fish as bait to recreational crabbers. He chuckled that he's sold "a million of 'em." His favorite mud shad activity, though, has been catching "peanut" (young-of-the-year) mud shad for rockfish bait in the river, during the fall and spring.

George Trice of Poquoson, a versatile waterman who participates in a

number of fisheries, often catches mud shad (he also refers to them as "nanny shad") in his gill nets when fishing for other species. "When I'm catching a lot, say March into April, I'll sell some for crawfish bait down South. Summertime, when menhaden don't last long in the pot, some crabbers will use them because they'll attract jimmies [large male crabs]."

Whitmore, fresh from DWR's fall electrofishing surveys on Virginia's tidal rivers, commented, "Though they're not a focus species, we catch and release plenty. The population is doing just fine. The Catch-per-Unit-Effort (CPUE) ranges from 25 to as many as 450 per hour. We often see big pockets of them in the edges of grass lines with steep five- to six-foot drop-offs, for example in the Appomattox. They like calm, turbid, open waters on channel edges. They're a channel fish."

In the end, Hildebrand and

Schroeder, writing nearly a hundred years ago, summed up the high value of the oft-scorned mud shad this way: "The importance of this fish among the commercial species, however, must not be judged from the quantity that is marketed and the price received. The food that the gizzard shad furnished for other fish, without itself eating foods utilized by most species, is no doubt of great economic importance... Living itself mainly upon food derived from the muddy bottoms of our very muddy rivers and lakes, it serves as a means of converting this mere waste of nature into the flesh of our most highly valued fishes." ❧

In more than 40 years at the Chesapeake Bay Foundation, Virginia native John Page Williams, championed the Bay's causes and educated countless people about its history and biology.

LET THE RIVERS FLOW

REMOVING DAMS FROM VIRGINIA'S WATERWAYS
RESTORES THEM TO HEALTHY HABITAT FOR
AQUATIC WILDLIFE.

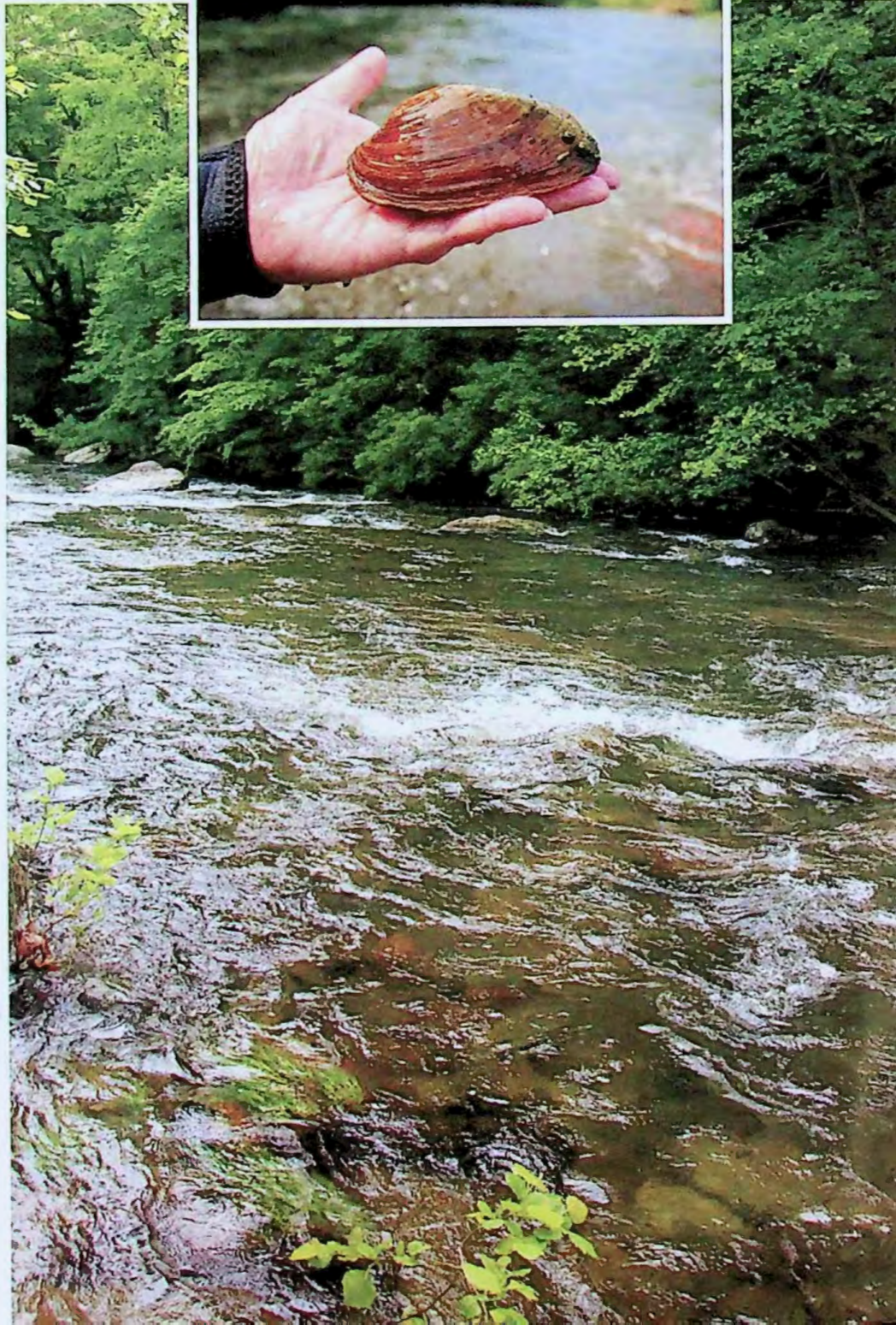
By Louise Finger/DWR

Starting in the early 1600s and continuing well into the 1900s, tens of thousands of dams were built across the United States to harness the energy of moving water. That energy was used to mill grains, saw lumber, power foundries and forges for industrial metal production, facilitate transportation of people and goods up and down rivers through lock/dam/canal systems, supply water to communities, and generate early sources of electricity.

Most of these structures were low-head dams, defined as dams that span the full width of a river, are typically less than 15 feet tall, have water flowing across the entire crest of the dam, and do not provide flood-storage capacity. Early dams were constructed of wood, then stone and mortar, and, eventually, concrete. At the peak of the low-head dam construction period, it's estimated that there were thousands of these dams in Virginia alone. Though the effective lifespan of most of these dams was only about 80 years and many have since failed or are at risk of failure, thousands of them remain as obsolete structures in our rivers and streams.

"Why does this matter?" you might ask. Dams have significant impacts on the natural processes that occur in rivers because they block the channel, slow the water, alter the habitat, and degrade

.....
Top: Freshwater mussels benefit from barrier-free rivers. Right: Free-flowing rivers greatly benefit a healthy ecosystem.



the water quality. Free-flowing rivers typically have areas of deep, slow-moving water that alternate with shallow, fast-moving water. In combination with sediment, vegetation, and other factors, these characteristics provide the complex variety of habitat for the different life stages of aquatic organisms such as insects, mussels, and fish. These features create appropriate ecological conditions to support native, riverine plants and animals.

The Drawbacks of Dams

By design, dams make the upstream water deeper and slower moving, which changes complex, river-like habitat into more uniform, lake-like habitat. This deep water essentially drowns what would otherwise be a diversity of shallower river features known as riffles, runs, and glides. As a result, the surface-water temperature goes up, dissolved oxygen goes down, evaporation rate increases, sediment settles out

upstream, scour occurs downstream, and the nutrient cycle is disrupted. All of these changes affect the condition of the habitat upon which the native aquatic species depend.

Additionally, dams are physical barriers to aquatic organisms' ability to move upstream, which creates a fragmented river system with isolated populations. These blockages inhibit, and often prohibit, the long-range migrations of fish species that spend part of

Monumental Mills Dam

The Monumental Mills Dam, located on the Hazel River in Culpeper County, was a privately owned dam originally built of wood in the early 1800s to provide power to mill grain for flour and later rebuilt using rock and mortar as part of a planned lock and canal transportation system in the 1850s. In 1921, it was increased in height using concrete and converted to generate electricity. Though defunct since flooding in 1942, and in a state of significant disrepair, it remained a river-wide blockage to fish and other aquatic organisms, created a boating hazard for the public, caused upstream sedimentation and downstream scour, negatively impacted the complexity of in-stream habitat, and disrupted river hydraulics.

This 10-foot tall, 160-foot long structure not only impacted aquatic-organism movement, sediment transport, and water quality upstream and downstream in the Hazel River for close to 200 years, but also significantly impacted recreational use due to limited portage opportunity on surrounding private land. In partnership with the dam owner and the U.S. Fish and Wildlife Service's (USFWS) National Fish Passage Program, and after significant historical review and documentation, DWR removed the majority of this structure in 2016.

The objectives were to restore the river's hydrology and ecology, to remove a public-safety hazard, and to provide aquatic organisms access to 28 miles of the mainstem Hazel River and a total of 285 stream miles including the upstream, accessible tributaries. With the removal of Monumental Mills Dam, the Hazel River—down through the Rappahannock River and all the way to the Chesapeake Bay—is free of artificial barriers. DWR fish population monitoring four years prior to and three years after removal of Monumental Mills Dam showed post-removal passage of channel catfish and sea lamprey, two species that were not found upstream of the dam prior to removal. The presence of sea lamprey is especially notable as it is an anadromous species, meaning it lives in saltwater and spawns in fresh water. Paddlers and anglers are also now able to safely navigate and enjoy the beauty of this portion of the Hazel River.



Monumental Mills Dam before removal.

Louise Finger/DWR



Monumental Mills Dam during removal.

Alan Weaver/DWR



Monumental Mills Dam site three years after removal.

Louise Finger/DWR

their lifecycle in the ocean and part in freshwater. Dams also impact the movement of resident fish that spend their entire lifecycle in freshwater and the mussel species that rely on them.

To reproduce, mussels must attach their larvae (called glochidia) to the gills, fins, and body of certain fish species, relying on those fish “hosts” for dispersal of their young. If the host fish cannot travel upstream, then the mussel larvae cannot either. Freshwater mussels play a critical role in filtering water (as much as 18 gallons per mussel per day), thereby improving water quality, but many of these species are either extinct, threatened, endangered, or in decline. Though it is speculated that there are multiple causes of this decline in mussel diversity and abundance, historic proliferation of dams is likely one of the contributing factors.

Humans are also directly impacted by the presence of low-head dams in our rivers because they are common drowning locations. Immediately downstream of such structures, the water recirculates strongly and results in a dangerous condition often referred to as a “roller.” At certain flow conditions, a roller makes it almost impossible for a boater or swimmer to escape. The calm, slow-moving water upstream of dams disguises this downstream risk.

Since no state or federal agency is charged with collecting data on drownings at low-head dams, the numbers are incomplete, but in the United States, there were at least 148 drownings at low-head dams between 2018 and 2021. In Virginia alone, there’ve been at least 19 such drownings since 1990, including two in 2022 at the Boshers Dam on the James River in Richmond. The public



Restoring free-flowing waters by dam removal helps create the clean gravel beds that fish species such as smallmouth bass need to spawn.

©Eric Engbretson/Engbretson Underwater Photography

safety hazards and liability presented by dams limits the recreational opportunity and accessibility of our rivers by requiring portage by tubers, boaters, anglers, and other river users, which can lead to conflict with private landowners whose property is adjacent to dams located in navigable waters.

Restoring Habitat and Resilience

Removing dams has numerous and significant benefits. Dam removal restores the physical and chemical processes and, thus, the habitat that would naturally occur within that body of water. By eliminating what amounts to a wall in the river, the stream channel is allowed to adjust back to its pre-dammed width, depth, and gradient. As a result, the conditions that native species need in order to thrive are restored.

A few of the positive habitat outcomes of dam removal include the return of clean gravels for spawning;

shallow, fast-moving features that oxygenate the water and provide ideal conditions for aquatic insects; and appropriately deep pools for cover and cool-water refuge. In addition, removing barriers to the movement of fish and wildlife decreases habitat fragmentation, which increases the resilience of all the species present in the river as climate conditions change.

The extent of upstream and downstream benefits of a dam removal varies with structure size, stream gradient, and other factors, but the direct impact on the stream habitat and processes can be far-reaching, often a mile or more. Depending on the proximity of other barriers, hundreds of upstream miles can be made accessible to fish and other aquatic organisms following a dam removal. Eliminating the public-safety hazard that low-head dams pose also increases the accessibility of rivers for safe, recreational use.

For More Information

- Additional information about dam removal can be found at AmericanRivers.org.
- The Southeast Aquatic Resources Partnership (SARP) (southeastaquatics.net) Connectivity Program maintains a database of stream barriers in the Southeast and provides a tool for barrier-removal prioritization (toolconnectivity.sarpdata.com).

If you own a low-head dam and would be interested in assessing its aquatic impacts and/or removing it, please contact Louise.Finger@dwr.Virginia.gov.

Removing obsolete dams restores streams for the benefit of all, and more of these structures are removed each year throughout the country. According to American Rivers, a nonprofit organization that promotes and tracks dam-removal projects, the number of dam removals completed annually across the country has been increasing since the early 2000s. Their database (at americanrivers.org) indicates that removals nationwide typically exceeded

70 per year since 2008, with a high of more than 110 dams removed in 2018. Despite these efforts, thousands of obsolete dams remain. In Virginia, at least 46 dam removals have been documented through 2021; recent examples include the removals of Monumental Mills Dam and Wilson Creek Dam.

Despite the multitude of benefits of removing low-head dams, their sheer number makes this endeavor challenging, but even more important,

to undertake. Many of these dams are located on private property, and the removal process can be lengthy and cumbersome, so partnerships and collaboration are critical to removing them and restoring the rivers both humans and wildlife rely on and enjoy. ❧

A lifelong resident of Albemarle County, Louise Finger has been working to restore aquatic habitats for 20 years in her "dream job" as DWR's Stream Restoration Biologist.

Louise Finger/DWR



Wilson Creek Dam before removal.

Louise Finger/DWR



Wilson Creek Dam during removal.

Wilson Creek Dam

The Wilson Creek Dam in Bath County was a rock-and-mortar/concrete dam constructed on U.S. Forest Service (USFS) land in the 1930s to provide water to Douthat Lake State Park, the Civilian Conservation Corps (CCC) camps located in the park, and local residents. By the mid-1950s, the state park had installed wells for their water supply, but water from Wilson Creek Dam continued to be piped to downstream residents until a devastating flood in 1985. Obsolete for decades and structurally compromised, this nine-foot tall, 50-foot long structure had significantly altered the creek's slope, dimension, hydrology, ecology, and habitat for almost 100 years.

Upstream settling of bed material had buried the channel, downstream scour had removed gravels important for fish spawning, and passage of native brook trout and other resident fish had been completely blocked. In 2022, the USFS, in partnership with DWR and Trout Unlimited, removed the majority of this dam, while leaving a portion intact for historical interpretation. The barrier was removed in an effort to restore the habitat and the appropriate channel conditions that allow for the natural movement of water, bed material, and aquatic organisms along this beautiful, coldwater mountain stream.



Wilson Creek Dam site two months after removal.

Louise Finger/DWR

Golden Oldies—

Five Classic Lures Your Grandfather Used That Still Work

By Gerald Almy

Modern computer-designed lures with ultrarealistic photo finishes, high-tech hardware, and laser-sharpened hooks catch plenty of fish. No doubt about it. But so do old-time lures invented 60, 80, even 100 years ago by avid fishermen with an idea and a dream.

The names in many cases have become legends: Zara Spook, Rat-L-Trap, Rapala Floating Minnow, Hopkins Spoon, Daredevil, Jitterbug, Johnson Silver Minnow, Mepps Spinner. Old-time lures crafted by avid fishermen, whittled out of chunks of cedar, hammered out of kitchen spoons... from fishing dreams came some of the greatest lures in history.

Here's a look at a few of these classic lures that still catch fish for Virginia anglers today.

Zara Spook

James Heddon was whiling away the time along a Michigan stream in the late 19th century as he carved on a piece of wood. Pausing for a break, he tossed the finger-long stick he had whittled into the swirling waters of Dowagiac Creek. Almost instantly a huge bass rolled up, grabbed the chunk of wood, and disappeared into the inky depths.

A light bulb went off in Heddon's mind as he thought about that event. He immediately set to work carving another piece of wood to mimic the size and shape of a large minnow. Heading to his tool shop, he added a set of hooks to it. With that act, Heddon created the first artificial "plug."

Taking it to the water, he found it did just what he hoped it would. It caught bass—lots of them! Making several more, he fine-tuned his carving technique and hook-mounting procedure. As the baits took on a more polished look, he set up shop and founded one of America's first lure companies, James Heddon's Sons, in 1894.

Inspiration didn't stop there. Heddon began designing a variety of artificials, some of the greatest fishing lures of



James Heddon's Zaragossa or Zara Spook lure.



James Heddon's Lucky 13 lure.

Anglers are always looking out for the next best thing, but classic lures designed decades ago still do the trick.



1948 print ad for Heddon lures

to the red-light district in Pensacola, Florida, at the time it was invented. Redesigned in 1939, the lure's name was shortened to Zara Spook, referring to the skeleton-like pattern painted on its flanks.

Tactics: No other lure compares with this offering for the "walking the dog" presentation—a side-to-side motion that drives bass crazy. Cast toward cover near shore, shallow flats, or fish schooling on top. Let the lure settle, then rhythmically twitch the bait with sharp jerks, giving slack line in between. The plug should jump first to one side, then the other. Once you get the feel for it, this "walking the dog" delivery is easy to use and drives bass, muskies, and stripers crazy when they are feeding near the surface.

Comment: "This is the first lure I turn to when fishing shallow coves in late spring and fall in big lakes," says Lake Anna guide Bill Mathias.

all time. Almost every angler has heard of or owned a Lucky 13. That's a Heddon creation. Others include the Bayou Boggie, River Runt, Crazy Crawler, and Torpedo, a surface offering with propellers that is devastating for James and Shenandoah river smallmouths.

The Zara Spook, though, may be Heddon's most famous inspiration of all. It was originally dubbed the Zaragossa, because it "had a wiggle like the gals down on Zaragossa Street," said its creator, alluding

Hopkins Spoon

When tidewater Virginia's Robert Hopkins set out to build a new fishing spoon in the early 1940s, he had two specific goals in mind. He wanted to create a lure that would cast for long distances to reach faraway gamefish un-spooked by his boat. Secondly, he wanted a lure that would entice a wide variety of saltwater species.

Both goals would help on his favorite fishing spot—the Chesapeake Bay. But Hopkins also hoped the lure would be broadly applicable to other saltwater fishing situations on the East and West Coasts. He even wondered if it might catch on for freshwater fishing.

Tinkering in his shop, Hopkins started with stainless steel knife handles. First he ground them down, then he pounded them with a hammer. His creation: the strange-looking No-EQL. Unlike most spoons, this one had no curve to the body, but was more like a slab of metal tapered towards the sides and both ends. It also had multiple indentions to catch light as it fell or wiggled on the retrieve. The offering caught every fish he tried it on in saltwater. It could also be cast great distances, even in the teeth of a wind, a common challenge on the Chesapeake.

In freshwater situations, the Hopkins spoon also caught fire, especially when vertically jigged for bass and stripers. Despite its plain-looking shape, the spoon has a fantastic wounded-shad action as it flutters down after lifting and then dropping the rod tip. The lure's rugged construction also makes it nearly indestructible.

Hopkins spoons are not cast or stamped out, but are forged from solid stainless steel to ensure the highest quality. The spoons are then plated with copper, nickel, and finally chrome to ensure the most durable finish possible. While the original No-EQL is still popular in saltwater, a later model developed by Hopkins' associate Robbie Roberts, called the Shorty, is a favorite of anglers going after largemouths.

Tactics: Find fish, baitfish, or structure on the depth finder, then lower the lure down to that depth or slightly higher. Pump it up sharply, then let it drop just fast enough so that no slack forms in the line. Try lifts of 12 to 48 inches. Most strikes will come on the drop. Be watching for the line to twitch, move sideways, or



The Hopkins No-EQL lure

simply stop falling. Also try casting the spoon toward surface-feeding fish in Kerr, Anna, Gaston, and other big lakes as well as the Chesapeake Bay. Retrieve with short pumps of the rod.

Comment: Dale Wilson, a longtime guide on Smith Mountain Lake, says "the Hopkins spoon is the best bait of all for suspended stripers and bass in both summer and winter situations when fish suspend in deep water."



A variety of Mepps Spinners.

Mepps Spinner

Todd Sheldon was helping customers in his sports shop in Antigo, Wisconsin, shortly after World War II when a GI walked in and placed a handful of Mepps spinners he'd picked up in Europe on the counter. Sheldon thanked the serviceman and put them in his personal tacklebox to try out later.

They languished there for more than a year before he pulled them out one day on the Wolf River when the fish wouldn't cooperate with his usual offerings. After tying on a Mepps, he quickly limited out on trout. Tracing the spinners back to France, he found that they had been catching fish for Europeans since Andre Meulnart invented them in 1938. He promptly ordered several boxes and began selling them in his Wisconsin store. Word spread quickly about the fish-catching powers of the flashy new spinning lures. (Mepps is an acronym for Manufacturier D'Engins De Precision Pour Peches Sportives, or Precision Equipment for Sport Fishing.)

In 1960, Sheldon obtained North American distribution rights to the lures. In 1972, he purchased Mepps France. The company now markets a variety of lures, but the classic Aglia spinner is still its best seller. Mepps spinners have accounted for more *Sports Afield* Fishing Contest winners than any other lure and are deadly on almost all freshwater species.

Tactics: For trout and panfish, try sizes 0 or 1. Large crappies and walleyes prefer a size 2. Bass and pickerel like sizes 3 and 4. Muskies and large northern pike will smack a size 5. Retrieve these lures slowly near the bottom for sluggish fish. When the quarry is feeding aggressively, work faster and higher in the water column. Probe structure such as logjams, points, docks, rock piles, and weed bed edges.

Comment: Glenn Peacock, who guides on multiple waters including the Chickahominy, says "the Mepps is great because it's such a versatile lure. It's effective on crappies, bass, yellow perch, and pickerel on the tidal Potomac and its tributaries."

Rapala Floating Minnow

Lauri Rapala was born in Finland in 1905. When he was in his 20s, he moved to the town of Riihimäki to try to make a living as a fisherman. While waiting for his nets to fill with perch and whitefish, he would row his wooden boat, trying to catch trout with lures to add to the day's catch.

A sharp observer of nature, Rapala noted that feeding trout always key in on a minnow with a wounded or wobbling movement, instead of the healthy ones. Deciding to make a lure to duplicate this action, he carved a piece of wood in the shape of a baitfish, glued tin foil from a candy wrapper on, and then etched in a scale pattern.

Tentatively, he cast his creation into the clear waters of Lake Paijanne and began trolling. The trout responded with reckless abandon. The lure enticed more fish than Rapala ever imagined possible. And it caught not just trout, but also pike



A Rapala floating minnow with original packaging.



Finnish fisherman Lauri Rapala invented the Rapala floating minnow.

and salmon. Word spread quickly about the fish-catching bait and soon Rapala had his sons helping him hand-craft the lures.

In the mid-1950s, a few of the lures found their way into the hands of U.S. fishermen. When he found out about the amazing thin-minnow plugs, Ron Webber came to an agreement with Rapala for distributing them through the Normark Corporation.

An August 1962 article in *Life* magazine (which had Marilyn Monroe on the cover) sent demand spiraling. Sixty years later, Rapalas are still one of the most popular lures in the world and a favorite of Virginia anglers. Many new lure varieties are now offered by the company, but the thin-minnow original lure is still one of the best sellers and entices strikes from a wide variety of gamefish.

Tactics: Extremely versatile, the Rapala works well trolled on flatlines, using downriggers, and cast and retrieved. Twitching the lure in place drives bass and pickerel crazy, but a slow steady retrieve is often best. Jerking and pausing, then V-waking the lure back so it creases the surface but does not dive under, is also deadly, especially on striped bass.

Comment: Lot Cooke, a Shenandoah River devotee, says he "would not be caught on the river without a box full of Rapala floating minnows in sizes from 2 1/2 to 5 inches." His favorite color is silver with a black back—the original colors chosen by Lauri Rapala over a century ago.

Courtesy of The International Game Fish Association

You Saw It in LIFE Magazine!

Rapala

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Johnson Silver Minnow

Louis Johnson, a retired Chicago foundry operator, was frustrated by the abundance of weeds that kept snagging the hooks on his lures in his favorite fishing lake. Eager to overcome the problem, he began tinkering with some household items, including a dinner spoon.



Johnson Silver Minnow

After cutting the handle off, he soldered a hook to it, and a weed guard to catch the vegetation that was frustrating his fishing efforts. The silver plating on the spoon was brighter than the chrome or polished steel lures available at the time. And the stiff weed guard was firm enough to ward off the weeds, yet flexible so it bent down when a fish struck, allowing a solid hookup.

The year was 1920, just over a century ago. That marked the birth of one of the best lures ever devised for fishing in waters thick with aquatic vegetation—the Johnson Silver Minnow. While the first effort caught fish, he knew it needed some fine tuning. After more experiments, Johnson eventually

forged a spoon out of a copper zinc alloy that was thicker in the middle than on the edges. This concentrated the weight in the center and made the spoon ride with the hook up, reducing snags further. It also made the lure rock back and forth on the retrieve, instead of spinning and causing line twist.

The Johnson Silver Minnow is a godsend for anglers fishing weedy waters. Sonny Gregory, a Back Bay guide, rated the Silver Minnow as his favorite lure for that body of water, where he hosted such famous anglers as Terry Bradshaw, of football fame.

Tactics: A steady retrieve right through aquatic weeds is the simplest and most effective presentation. Also try pausing when the lure reaches the edge between open water and

vegetation or a drop-off. The Silver Minnow will also produce around brush piles, sunken logs, rocks, and bridge abutments.

Comment: Gregory told me "the Silver Minnow is without a doubt the single best lure for catching largemouths in thick aquatic weeds." 🐟

Gerald Almy lives in the Shenandoah Valley but travels widely for his work as a full-time outdoor writer. Among his many accomplishments, he is currently a columnist for *Sports Afield* and contributing editor for *Field & Stream*.



Explore the Wild at the

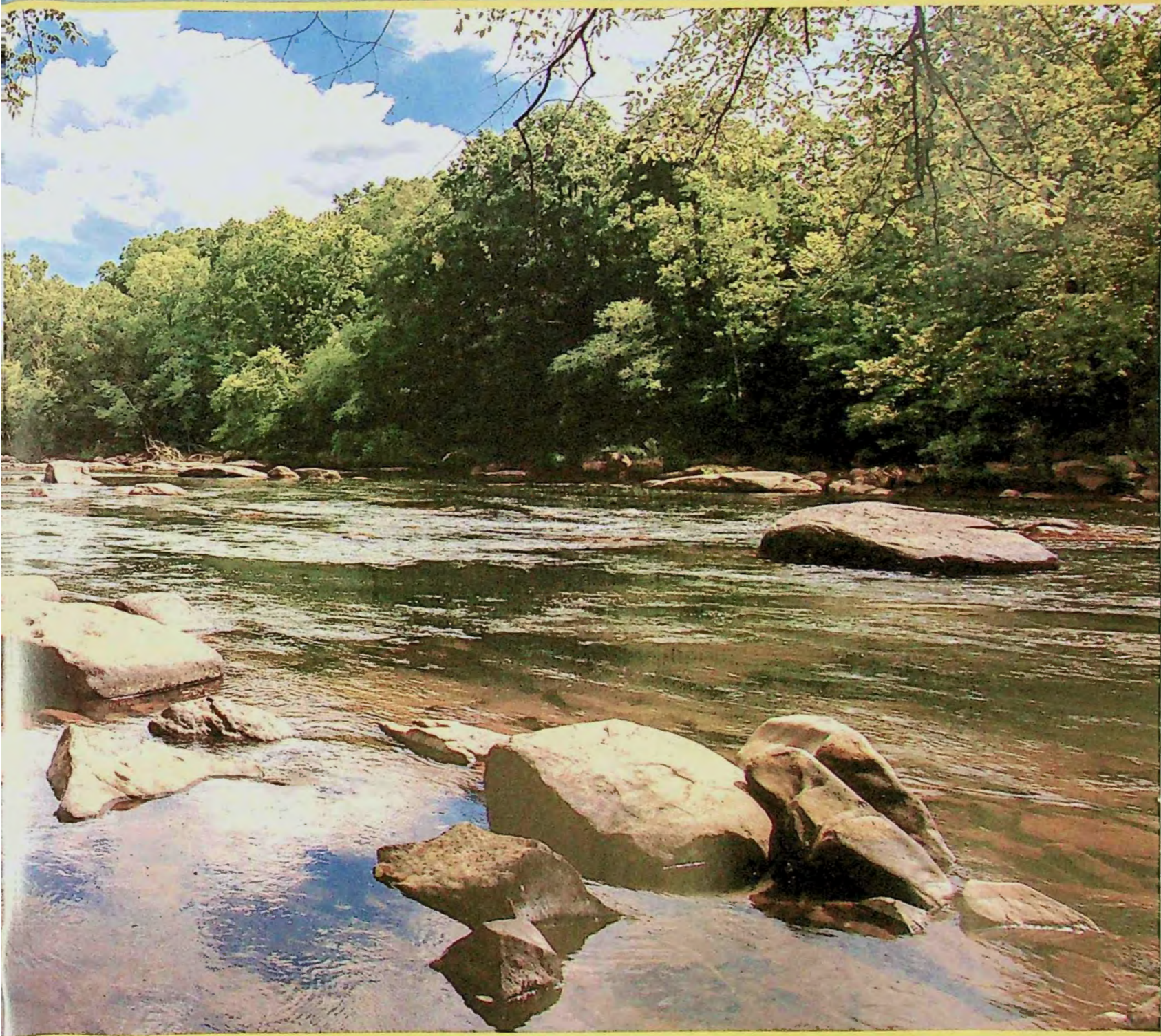


The Virginia Department of Wildlife Resources maintains 78 Wildlife Management Areas (WMA) and Wildlife Conservation sites (WCS), with nearly 250,000 acres of land managed for a diversity of wildlife habitats and open to the public for wildlife-related recreational opportunities. For more information: virginiawildlife.gov/wma.

Photo by Meghan Marchetti/DWR

C. F. Phelps Wildlife Management Area

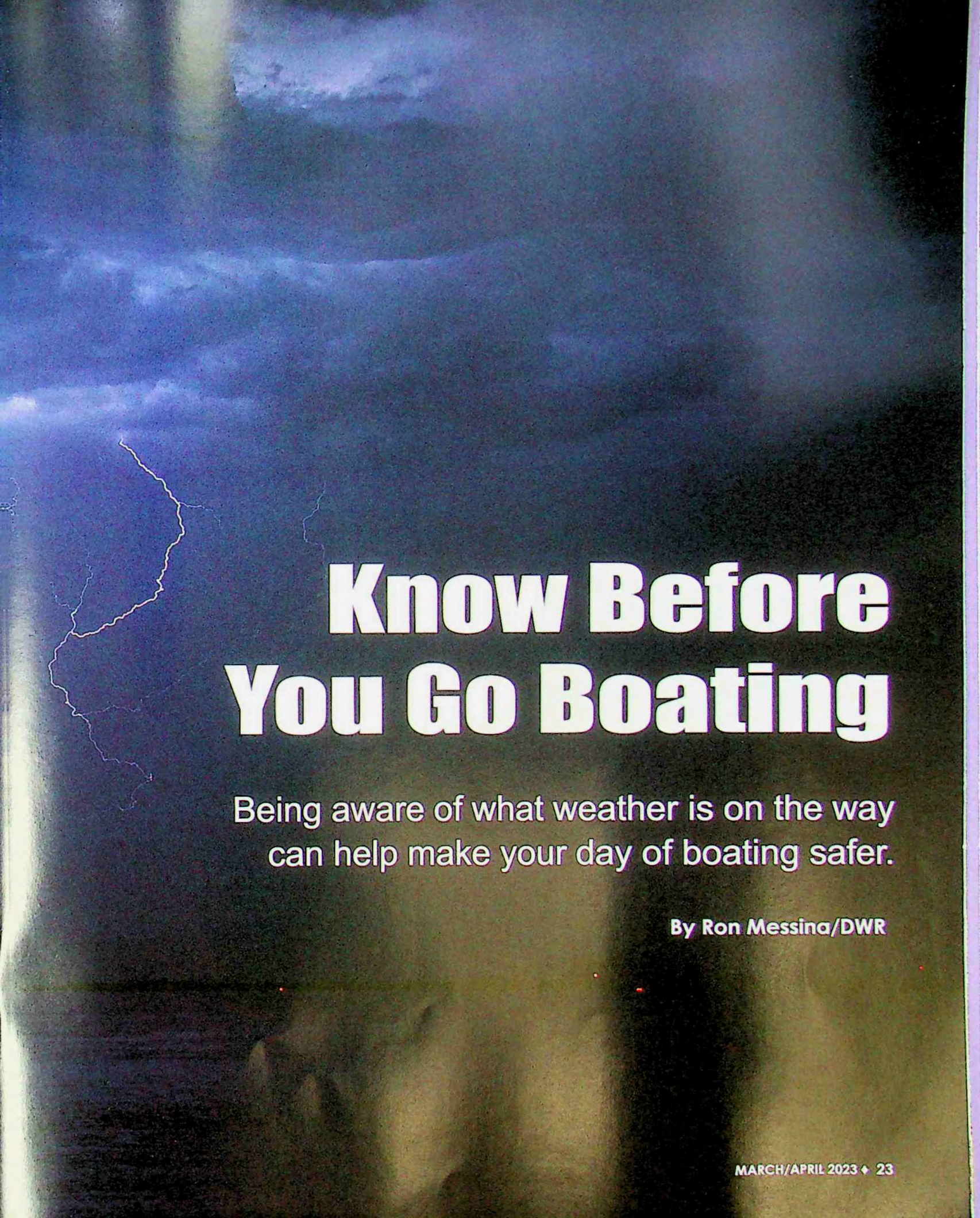
✓Hunting ✓Trapping ✓Primitive Camping ✓Hiking ✓Warmwater Fishing ✓Birding
✓Boat Ramps ✓Range



With forested areas, a three-acre pond, six miles of Rappahannock River access, and more than 1,000 open acres, Chester F. Phelps WMA is a prize example of multiple-recreation land use. Most of the 4,539 acres are in southern Fauquier County with the balance being in Culpeper County. Hunting opportunities include deer, turkey, dove, rabbit, quail, squirrel, and several species of ducks. The pond holds largemouth bass, bluegill, redear sunfish, and channel catfish. The river is a unique smallmouth, redbreast sunfish, and fallfish fishery. Wildlife viewing, hiking, nature photography, and the sighting-in range are also popular.



©Shutterstock



Know Before You Go Boating

Being aware of what weather is on the way
can help make your day of boating safer.

By Ron Messina/DWR

When a mother cat carries her kittens one by one down the gangway of a ship about to head out into rough seas, it might be a good idea to take note. Legend has it that one 19th century passenger witnessed the cat's work and decided not to take a trip on the steamship Portland. It turned out to be a good decision.

It was November 1898, and just off the Virginia coast, a storm was blowing up. Ice-cold air jetting down from Canada was mixing with balmy Gulf Stream warmth—the perfect recipe for a nor'easter. Barometers plummeted, and the massive low-pressure system ripped northward along the Atlantic coast, wind and waves crushing everything in its path.

Up in Massachusetts, the big side-wheel steamship SS Portland was about to depart Boston on a commuter run, ferrying 192 passengers to Portland, Maine. With wind and dark clouds looming, the ship's captain had a decision to make—do I stay or do I go? He poured on the coal in hopes of beating the bad weather to port.

Weather forecasting was in its infancy, and there was no ship-to-shore communication, so the captain had no way to know he was steaming into one of the deadliest nor'easters ever recorded. The Portland sank in the storm, with all hands lost. The "Portland Gale of 1898" ultimately sank 150 vessels and claimed 400 lives.

Should I Stay or Should I Go?

Gale force winds, waves, and lightning have always played fast and loose with mariners and their boats. While we no longer need to rely on intuition to foretell storms, we still must make good decisions. Even today, with satellite technology, custom marine forecasts, and precise storm track modeling available on our smartphones, boaters still occasionally run afoul of the weather, and still must routinely decide, "do I stay or do I go?"

Jeff Orrock, Meteorologist-in-Charge at National Oceanic and Atmospheric Administration's (NOAA) National Weather Service office in Wakefield, Virginia, said that boaters in the mid-Atlantic always need to be vigilant, but especially during fall through spring when Virginia's weather becomes more variable day to day. Orrock advises boaters to check the weather early and often, and to pay close attention to the wind speed trends, which change frequently.



An artist's rendition of the SS Portland on that fateful day in 1898.

Courtesy of Allie Ryan Collection, Maine State Museum



Meghan Marchetti/DWR

Jeff Orrock is the Meteorologist-in-Charge at the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service office in Wakefield.

*"The good seaman
weathers the storm
he cannot avoid
and avoids the storm
he cannot weather"
- unknown*



"If I'm going boating two or three days from now, I'll start watching the forecast for the day I'm going out," said Orrock. "In the summertime, things don't change much. But you start getting into September, October, November, all the way through to July, cold fronts are coming down, coastal storms are forming, and weather patterns are moving fast."

The mid-Atlantic is well known for its dangerous nor'easters—big coastal storms that rotate counter-clockwise, with winds rolling out of the northeast, and crushing waves, rain, snow, and lighting. When the conditions are right, they can develop quickly, sometimes within only a few hours. Up until the mid 2000s, these storms were notoriously difficult to forecast accurately because computer weather modeling wasn't advanced enough.

Nor'easters are more common from fall to late spring, which happens to coincide with some very good fishing opportunities. With today's modeling technology, meteorologists can accurately forecast nor'easters several days ahead of time, before the weather systems that combine to create them exist. While this is good news, it can sometimes lead to problems for boaters since conditions appear fine to go fishing or pleasure boating—until they suddenly don't. Orrock calls these "rapid intensification storms. We've had folks get into serious trouble because the conditions change dramatically," he said. "Keep an eye on the forecast. Mother Nature will humble you pretty quickly."

Wind and Waves

For recreational boaters, wind is one of the major factors to consider before heading out on the water. Wind-driven waves can quickly turn a fun day on the water into a rough, unpleasant boat ride. The National Weather Service issues wind advisories to help boaters determine wind risks.

Small craft advisories kick in around 20 knots on the bay, and 25 knots on the ocean. A small craft advisory is issued when local winds have reached dangerous levels for a small boat. Each boater needs to know the limits of their boat and their own skill level, and determine how much wind and wave action they can safely tolerate.

There's no official definition of "small craft" for the advisory. NOAA states that: "Any vessel that may be adversely affected by Small Craft Advisory criteria should be considered a small craft. Other considerations include the experience of the vessel operator, and the type, overall size, and sea worthiness of the vessel."

At 34 knots, the gale warning force designations begin, and Orrock said, "conditions are going to be severe for most average mariners, and even the larger cargo vessels and ships coming into port have to take different precautions, because that's a lot of wind, and it really pushes those big boats around."

Storm and hurricane warnings are both severe enough

that no boats should be on the water and even larger commercial shipping fleet boats should be headed to safer waters. Outflow winds from these powerful storms can cause severe conditions for boaters even if they're hundreds of miles away.

"Wind fetch," the distance wind travels over water, has a direct impact on wave size. The longer the fetch, the larger the waves. The nuances of wind, wave, and tide patterns might not always be available on your local TV weather report, but fortunately, the NOAA Marine Forecast Discussion at weather.gov can help boaters navigate complex coastal weather trends.

The Best Source for Marine Weather Information

NOAA's weather.gov/marine website has all the weather information boaters need, including interactive marine forecasts of Virginia's larger rivers, the Chesapeake Bay, and offshore waters all organized by zone, so boaters can drill down to the exact location they'll be boating and find hour-by-hour details on conditions like wind speed, wave activity, and precipitation. It's an essential resource boaters can add to their checklists before heading out on the water.

Weather.gov/marine also hosts the Marine Forecast Discussion, featuring experts breaking down their thoughts on the precise timing of weather events, explaining what's happening on the water and why. You might learn terms such as "outflow winds," which occur when a storm hundreds of miles off the coast causes big swells coming back to the beach on an otherwise bluebird day. This kind of interpretive analysis goes well beyond a typical forecast, providing the insights essential to boater safety.

Advisories and Warnings



Small Craft Advisory: Winds of 18 to 33 knots, or 24 to 38 miles per hour.



Gale Warning: Winds of 34 to 47 knots, or 39 to 54 miles per hour.



Storm Warning: Winds of 48 to 63 knots, or 55 to 72 miles per hour.



Hurricane Warning: Winds greater than 64 knots, or 74 miles per hour.

We All Get Caught

But even with the best information, sometimes weather still surprises boaters.

"I've been boating for over 20 years now, and the thing about boating is, you're going to get caught—all boaters get caught. I think the top thing that catches us off guard is thunderstorms," said Orrock.

Like many other recreational boaters, he's had run-ins with fast-moving thunderstorms that "pop up" in the summertime. The first time he tried to race a storm back to the marina he made it in time—the black clouds were still a couple minutes away—but as his wife stood on the bow tying the line, two blasts of lighting struck very close, with simultaneous thunderclaps. Lighting routinely strikes miles away from the edge of a storm cloud. "Lightning gets people every year; it's probably the biggest risk you face out there on the water," Orrock said.



Virginia

Boating Safety Checklist:

- Check the weather, wind, and tides for the location you will be boating at weather.gov before your trip
- Have a float plan and let people know where you're going
- Carry a cell phone in a waterproof bag
- Have a working VHF radio or handheld radio aboard
- Keep boat maintained and check lights and equipment
- Always wear a lifejacket
- Take a marine weather course, available at COMET.Met Ed: meted.ucar.edu/index.php, and, United States Coast Guard: uscgboating.org/recreational-boaters/boating-safety-courses.php

"In summertime, if you go boating in the afternoon, there are often thunderstorms," said Tom Guess, a former Boatswain's Mate in the Coast Guard and Boating Division Director at the Virginia Department of Wildlife Resources (DWR). "You can have a thunderstorm come in, and all of sudden you have no visibility, you've got a lot of wind, you got a lot of chop, you've got lightning all around you. If you're in a motorboat or a small boat with an open cabin, all of a sudden you realize you're not very big in that body of water at all."

If caught in the thick of a fast-moving thunderstorm, it's best to reduce speed and head into the wind and at a 45-degree angle to the waves. If you're near shore, another tactic is to find a sheltered cove and set anchor in five or six feet of water to ride it out. Stay low under the hardtop to be safer from lightning, or settle into the cabin if the boat has one. That's exactly what Orrock did with his family on another occasion, when he was eight miles from the marina. "It was heavy rain, a little bit of lightning, some gusty wind, but we were fine," he recalled. "The waves weren't too bad because we were so close to shore."

Guess advises to always check the currents, especially if you're going out on a bigger body of water like the Chesapeake Bay or larger rivers. "If you've got an outgoing tide, and you're in the mouth of a river, you can get a lot more chop," he said. "In inlets, if you've got an outgoing tide—the tide's ebbing, the wind's blowing inshore—you'll go from having waves to having breakers."

Guess said that many recreational boaters, even those with many years of experience, are creatures of habit. They leave from the same ramp, go to the same fishing spot, and rarely deviate from their plan.

"And they've never been caught in fog, or in severe weather, or they've never been halfway out and for some reason don't get to their destination, because everything always works out. But the first time they have to figure out where they are and how to get back, it's a whole different ballgame," Guess noted.

Being prepared for an unexpected setback is essential. One tool that's convenient for boaters to utilize is the ubiquitous cell phone. Guess said that smartphones have become "gamechangers" in recent years with apps that are easy to use for everything from checking the weather radar in real time, to marine navigation and float plans.

Orrock advised all boaters to "be careful with 'wish-casting,' or saying, 'this is what I want to do today, weather forecasters are always wrong, so I'm just going to go.' Boating and weather is about being knowledgeable, so check the weather, check the forecast, watch the trends over several days, and know what conditions will be at the location where you're planning to go boating."

Ron Messina enjoys writing, photography, and the outdoors. He's the Video Production Manager at DWR.



FINDING FISH IN URBAN

Don't let views of a highway stop you—

By Gregg Rockett

As an avid fly fisherman who generally targets trout, I usually have to go a fair distance—about a 90-minute drive—from my home in Arlington to find trout water. However, if I want to stay closer to home in Northern Virginia, I don't have to go very far to find opportunities to fish with a fly rod.

We are fortunate in the Commonwealth of Virginia to have some 226 species of fish, as identified by the comprehensive *Field Guide to Freshwater Fishes of Virginia*. This book attributes the diverse fishery to Virginia's adjacency of the Chesapeake Bay and Atlantic Ocean, drainage from the Mississippi River, and more than 27,000 miles of streams and rivers.

We also benefit here from a mix of southern and northern climate types. The official website of Virginia tourism describes it as a "Goldilocks Climate—not too hot and not too cold." I find I am able to fish pretty much year-round, with a few breaks to avoid intensely humid summer conditions or frigid winter days (although I have been known to fish for trout in icy Virginia rivers with snow on the ground in January).

The seasons dictate which species I will target, with both autumn and spring my favorites for trout fishing. Although there are no local waters that hold trout year-round, there are two local streams—Holmes Run and Accotink Creek—that are stocked with trout by the Virginia Department of Wildlife Resources (DWR). These are designated as Delayed Harvest Waters and are usually stocked three times over fall, winter, and spring. They provide some nice trout fishing for a few weeks a year in unlikely oases that lie within the urban confines of the Washington beltway.



©Robert E. Juarez

In fact, DWR's Urban Fishing Program (virginiawildlife.gov/fishing/trout/urban/) stocks trout into a variety of urban waters across the state from November 1 through April 30, with stocking dates announced the week prior to stocking.

Two Spots for Trout and More

Accotink Creek is a 25-mile tributary of the Potomac River that begins upstream of Lake Accotink in Fairfax County. Finding parking for Accotink is relatively easy as there are a number of parks and baseball fields that border the creek, including Americana Park, which is situated along the southwest clover leaf of the junction of Little River Turnpike and I-495. In fact, a number of very productive fishing holes lie directly underneath the noisy cloverleaf junctions and off/on ramps of the Capital Beltway.

Holmes Run is a first-order tributary of the Potomac River and runs through Fairfax County and the City of Alexandria. In the vicinity of busy Columbia Pike, the Holmes Run Trail parallels the stream through Holmes Run Stream Valley Park, a forest oasis sheltered from densely populated neighborhood areas of Seven Corners, Bailey's Crossroads, Annandale, and Landmark. Access to parking for this section of Holmes Run is more challenging, with some limited space at the trailhead off Columbia Pike (only accessible from the eastbound lanes), although some neighborhood street parking may be found in the vicinity of Glen Hills Park and Dora Kelley Nature Park.

Both Holmes Run and Accotink Creek have a variety of other species that will take a fly, including creek chub, bass, and panfish. The latter can be voracious and provide a few hours of non-stop catching fun when they spawn in summertime. This also can hold true for smallmouth bass nesting in

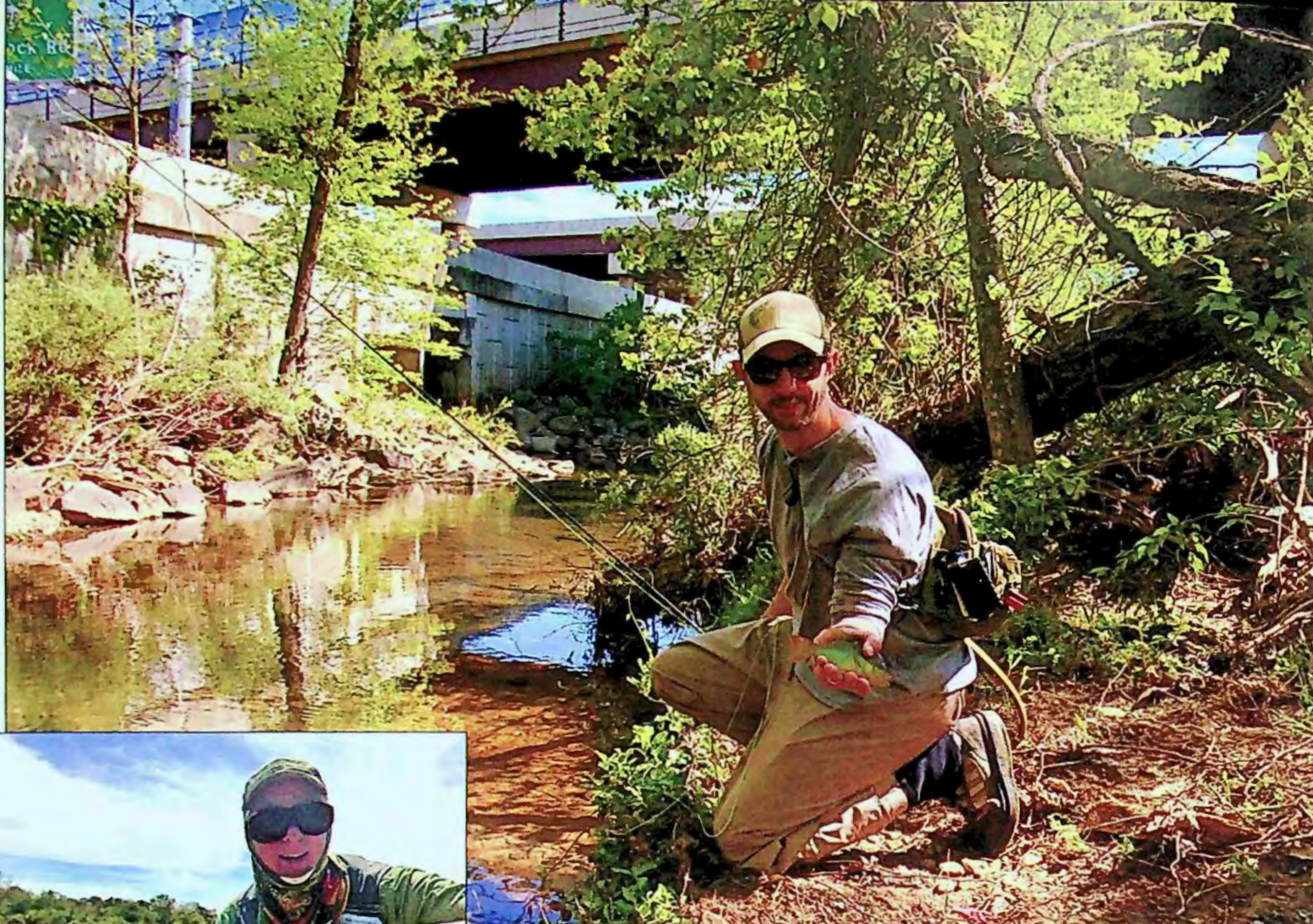
Above: A stocked rainbow trout netted and released in Accotink Creek. *Right:* Four Mile Run experiences extreme tidal changes that can lure a variety of species upstream from the nearby Potomac River.

©Anna Rockett

NORTHERN VIRGINIA

urban fishing in Northern Virginia
is surprisingly productive.





Some great fishing holes can be found on Accotink Creek under the Capitol Beltway.



The author with a migratory shad caught on the Virginia side of the Potomac River.

these same waters in spring and early summer. Creek chub spawn about the same time and build elaborate nests out of river pebbles that look like underwater castles.

The Shad Run

The prime springtime fishing opportunity in our area is, in my opinion, the epic migratory run of waves of shad up tributaries of the Chesapeake Bay, including the James, Rappahannock, and Potomac rivers. The shad run begins in March when water temperatures reach above 50 degrees and can last until May. That migration includes species of perch and herring, as well as the state's official saltwater fish, the striped bass.

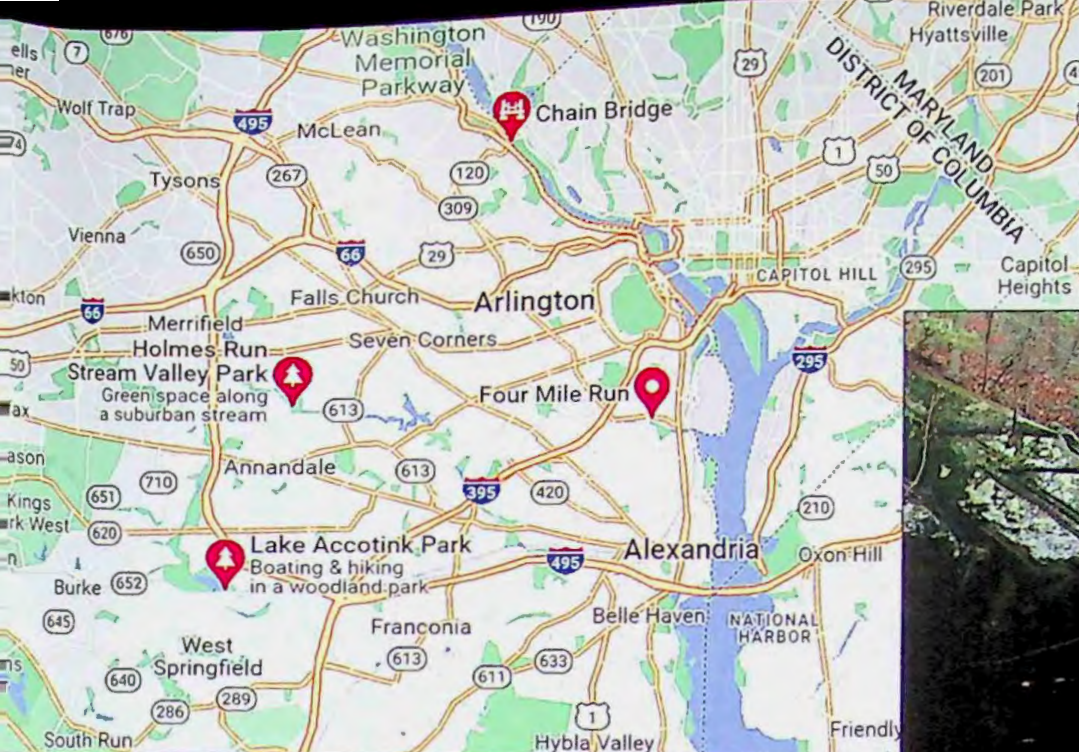
I spent one May morning with a fishing consultant and guide on the Virginia side of the Potomac River underneath the Chain Bridge, which links the sleepy neighborhoods of North Arlington, Virginia with the Palisades area north of Georgetown in the District of Columbia. We were primarily

targeting hickory and American shad, but at this time of year the catch could also include any of more than a dozen species of fish, both resident and migratory, including three types of shad, two types of perch, three species of catfish, alewife, herring, and striped bass.

This is urban fishing at its most raw, with rocky promontories jutting out into the fierce current of the Potomac and a constant rumble of traffic on the steel girder viaduct above. Surrounding us were anglers of a variety of demographics and techniques, while the guide and I stood out as the lone fly fishermen on the bank!

The water conditions were not ideal and had not been throughout most of that spring. The area had received more than six inches of rain during the month of April, which is twice the typical rainfall for that month. The water was the color of chocolate milk and flowing at a brisk 12,500 cubic feet per second, so I needed a sinking fly line and heavily weighted fly to get deep enough for the fish. There was also no room to back cast, so I had to roll cast over the current and mend my fly line several times to get a good drift and swing of the fly.

Despite the less than ideal conditions, we hooked up multiple species of fish, including hickory shad, white perch, multiple herring and alewives, a gritty gizzard shad, and my first quillback. The quillback is an odd fish and generally not easy



Red markers show locations for Accotink Creek, Holmes Run, Four Mile Run, and the Chain Bridge over the Potomac River.

to catch because of its sucker-like mouth on the underside of the fish. It is carp-like in appearance, but is actually a member of the sucker family, hence the full name quillback carpsucker.

A Plethora of Fish Species

Another urban water in Northern Virginia that is rich with fish species is the Four Mile Run, which extends some nine miles through Falls Church, Arlington and Alexandria and empties into the Potomac River near Ronald Reagan Washington National Airport. The downstream portion borders some densely populated areas of South Arlington and becomes tidal below the fall line near the Route 1 bridge.

The tidal influence from the Potomac together with a wastewater treatment plant in Arlington pumping warmer water into Four Mile Run attracts a plethora of fish species year-round, including striped bass, carp, yellow perch,



© Anna Rockett

Holmes Run is bordered by some of Northern Virginia's most popular neighborhoods.

snakehead, and the other warm-water species highlighted previously as common in the other urban waters of Northern Virginia. This tidal shift can be extreme, and wading outside of low-tide conditions is not recommended. There are reasonable options for shore fishing at various spots along the Four Mile Run Trail on both sides of the river, as well as under the Route 1 bridge. There is also a ramp for launching a canoe or kayak off Commonwealth Avenue at the Frank Mann baseball field.

These are but a few options for the urban angler in Northern Virginia. Great fishing is closer than you think! 🎣

Gregg Rockett blogs about fishing adventures in the metropolitan DC area, and further afield, at www.therockettman.com.



Fish Local VA

Looking for great options for fishing without a long drive? Check out the Virginia Department of Resources' (DWR) Fish Local initiative, which highlights excellent fishing opportunities that exist in your own backyard, even if you live in one of Virginia's urban areas. DWR works closely with municipal, state, and non-governmental partners to establish quality fisheries in and around metropolitan areas throughout the state, stocking catfish, trout, largemouth bass, and sunfish in many of these waterbodies, providing a great chance to connect to the outdoors. virginiawildlife.gov/fishing/fish-local/ For fishing locations throughout the state, including trout waters, lakes, and rivers and streams, check "Where to Fish in Virginia" on the DWR website: virginiawildlife.gov/fishing/where-to-fish-in-virginia/

Working for Wildlife

By Molly Kirk

The mission statement of the Department of Wildlife Resources (DWR) reads that we seek to conserve, connect, and protect: **Conserve** and manage wildlife populations and habitat for the benefit of present and future generations. **Connect** people to Virginia's outdoors through boating, education, fishing, hunting, trapping, wildlife viewing, and other wildlife-related activities. **Protect** people and property by promoting safe outdoor experiences and managing human-wildlife conflicts. Here are a few of the many accomplishments of DWR staff in working toward those goals...

Maggodee Creek Channel and Bank Restored



Louise Finger/DWR

Maggodee Creek before pier removal.



Louise Finger/DWR

Maggodee Creek during pier removal.

Abandoned bridge piers in Maggodee Creek, a tributary to the Blackwater River in the Roanoke River Basin in Franklin County, Virginia, had for decades caused debris jams in the center of the channel, resulting in deposition upstream and downstream, lateral channel migration, and bank erosion. In partnership with the streambank landowners, DWR removed three mid-channel bridge piers, restored 100 feet of channel and bank to a stable dimension and profile, created a floodplain bench, stabilized the eroding bank, and re-vegetated the bank and floodplain for long-term stability.

Many aquatic species in Virginia's Wildlife Action Plan could potentially inhabit Maggodee Creek, including Roanoke logperch (though not currently present), Atlantic pigtoe, orangefin madtom, Roanoke bass, notched rainbow, American eel, ashy darter, blotchside logperch, and Carolina slabshell mussel. Since excess sediment loading is considered a serious threat to mussel and fish species, restoration of migrating channels, stabilization of eroding streambanks, and establishment of riparian buffers is critical to protect and increase these populations.



Louise Finger/DWR

Maggodee Creek channel and bank restored.

Skill Bridge Veteran Completes Internship

As part of DWR's involvement with the Department of Veteran's Services and the Department of Defense's Skill Bridge Program, Coast Guard Petty Officer Trace Stauble completed 12 weeks as a Skill Bridge Intern with DWR. The Skill Bridge Program offers agencies or businesses the chance to help a service member transition to civilian life and get work done for their organization, adding to the service member's skill set and experience, while the service branch continues to pay and provide benefits for the intern.

Working with DWR staff at the Big Woods Wildlife Management Area (WMA), in conjunction with small game program staff and staff from The Nature Conservancy (TNC), the Virginia Department of Forestry (DOF), and the Virginia Department of Conservation and Recreation (DCR), Stauble completed multiple tasks and trainings, accomplishing work for DWR and our partners and gaining key skills to help him in his continued pursuit of a career in natural resources. His work ranged from conducting radio-telemetry on southeastern fox squirrels to such tasks as helping update autonomous recording units, becoming qualified as a wildland firefighter, and helping paint gates. Stauble pitched in wherever needed, representing his branch of service very well.

"As a veteran myself, my heart goes out to those about to transition back to civilian life. Anything we can do to help them with that transition while also getting valuable work done for our agencies is a win-win," said Marc Puckett, DWR's small game project leader, who helped oversee Stauble's internship. "Veterans usually bring a solid work ethic, initiative and enthusiasm with them. They also have a lot of experience working as part of a team. I am hopeful that the Skill Bridge Program will become more widely known and utilized in our field of wildlife conservation. In terms of the agency, it only costs us a little time in preparing an internship work plan, with the intern continuing to be paid by their service branch."



Courtesy of Trace Stauble

Coast Guard Petty Officer Trace Stauble completed 12 weeks of a Skill Bridge internship.

Learning to be Stream Smart

Five DWR staffers from the Aquatics, Lands and Access, and Capital Programs divisions attended a Stream Smart training hosted by U.S. Fish and Wildlife Service (USFWS) in Charlottesville in December. This workshop presented information on how to provide aquatic organism passage and improve flood resiliency when designing road/stream crossings. Topics covered included:

- The ecological functions and value of free-flowing streams
- The principles of building Stream Smart crossings
- The regulations related to new or replacement road-stream crossings
- The funding opportunities to support road-stream crossing replacements
- The Stream Smart Demonstration Table displaying concepts of natural streams, impacts of improper crossings, and how to create a variety of appropriate crossings

This information will be important for our Capital Programs staff and Wildlife Management Area biologists/managers when making decisions about replacing road-crossing structures (culverts) on DWR land so that fish and wildlife passage, as well as public safety and flood resiliency, are taken into consideration.



©Alex Abbott

Stream Smart Demonstration Table reveals the concepts of natural streams.

Finding Ecological Answers and Educating at The Clifton Institute



This northern Virginia nonprofit seeks to inspire the next generation of environmental stewards, restore habitat, and conserve biodiversity.

By Glenda C. Booth

Photos and graphic courtesy of The Clifton Institute

At any given moment at The Clifton Institute, you can find researchers examining vernal pools, families enjoying a guided nature walk, volunteers helping with plantings, or a school field trip exploring a field. The vibrant 900-acre complex, a former farm bequeathed in 2011 for scientific research and education, has a wide variety of habitats—forests, grasslands, shrublands, wetlands, vernal pools, streams, and ponds—each of which is home to a different community of plants and animals. Researchers have documented

more than 2,000 species of plants, animals, and fungi at the property near Warrenton, Virginia.

The Clifton Institute's mission is "to inspire a deeper understanding and appreciation of nature, to study the ecology of our region, to restore habitat, and to conserve native biodiversity." They do so through environmental education programs, conducting ecological research, and by restoring habitats for native plants and animals.

"The folks at The Clifton Institute are deeply committed educators and

scientists. They provide invaluable programming, research, and volunteer opportunities for people of all ages and backgrounds," said Chris Miller, President of the Piedmont Environmental Council.

"The connection between science, restoration, and education is pretty unique," said Eleanor Harris, Clifton's managing director. "There are a lot of education centers, but they're not necessarily doing research there, and there are a lot of research stations that aren't necessarily working with young people



Clifton educators demonstrate identifying bird species by wing coloring.



Restoring habitats with native plants is key to The Clifton Institute's work.

©Glenda C. Booth

to educate. I think it's cool that we're trying to integrate all three pieces—science, restoration, and education. We're getting young people experience in being involved in scientific research, which also benefits our scientific research, which then has a big impact because it's getting out to a lot of people. It's mutually beneficial for all the programs.”

Answering Questions

Harris, who holds a PhD in computational biology, shares the running of Clifton with her husband, Bert Harris, who has a PhD in ecology and evolutionary biology. Eleanor oversees the educational program, while Bert focuses on the research and restoration projects.

On staff at Clifton is an education associate, a land management outreach associate, a habitat specialist, a native seed project coordinator, a communications associate, and an administrator. “Every year, we hire technicians to help with specific projects,” said Eleanor. “They come to us with varying degrees of experience. We like to have one who has a good amount of experience, but we also like to hire people earlier in their careers so they can get experience in field science. We hope it’s an educational

experience for young scientists to participate in our projects.” In addition, Clifton hosts graduate students for research projects.

The Institute’s research centers around four topics:

- conservation and restoration of native grasslands and savannas
- conservation of declining species on working lands
- mitigating the effects of suburban and exurban development
- measuring the effects of climate change on biodiversity



©Bob Schamerhorn

Habitat work done at The Clifton Institute aims to restore habitats used by grassland species in decline, such as the Eastern meadowlark.

Their land management and restoration work focuses on early successional habitats, areas that have been disturbed by mowing, fire, or grazing and are now re-growing into forests. These habitats support a disproportionate number of species that are declining across their range.

Bert and his team are restoring 110 acres of overgrazed cattle pasture to a native grassland by eliminating non-native plants and putting in native grassland plants that they maintain by mowing or prescribed burning. They are testing eight combinations of methods to determine how best to help declining native species and measuring the methods’ effectiveness.

In the summer of 2020, Clifton joined researchers from the Restoration Ecology Lab at Virginia Tech in a study funded by the Virginia Native Plant Society. They surveyed 38 remnant grassland sites in five counties, recording more than 450 species of plants, including several rare or threatened species. Before European settlement, most of Virginia’s crop and grazing land was likely grassland, but today it’s just a fraction of that. Grasslands in Virginia typically have warm season grasses and



Children participating in summer camps or educational programs at Clifton can learn to appreciate nature.



Prescribed fire is one of the habitat management tools used at The Clifton Institute to create and maintain early successional habitat.

wildflowers—plants that can naturally regenerate after a fire.

Clifton's scientists use the terms "grassland" and "prairie" interchangeably to mean a habitat dominated by grasses and wildflowers, with few shrubs and no trees, explained Eleanor. A savanna is an open area with some widely spaced trees.

As grasslands and shrublands decline, so do the wildlife that depend on them. Examples of birds include American kestrels, grasshopper sparrows, Eastern meadowlarks, and bobolinks. Examples of shrubland species in decline are prairie warblers, field sparrows, and yellow-breasted chats. Northern bobwhite quail and Eastern meadowlarks have lost more than 75 percent of their populations in the last 30 to 40 years, *The Bay Journal* reported in November 2021. Beginning in 2018, Clifton staff, collaborators, and volunteers have conducted bird, butterfly, and plant population surveys at the property.

More than 90 percent of Virginia

land is in private ownership. By better understanding how declining wildlife species use agricultural and other open habitats, Clifton's researchers hope their findings can help private land managers better support wildlife and slow population declines.

Studying Wildlife

In partnership with the Smithsonian's Conservation Biology Institute, Clifton's scientists are seeking to understand why American kestrels (*Falco sparverius*) are declining across northeastern North America. They equip the birds with GPS transmitters and analyze how kestrels, which hunt by day, use different types of fields and how their use changes through seasons. Clifton's scientists want to know which agricultural habitats and grasslands are ideal for kestrel foraging so that landowners can help kestrels.

Their preliminary results suggest that kestrels use wildflower meadows for hunting rodents and insects early in the

season and then switch to cattle pastures later in the season when meadow vegetation grows taller. This conclusion is from tagging only female kestrels, they caution. "The females are bigger and therefore the GPS transmitter is a smaller percentage of their weight," explained Eleanor. "Now that we've seen how well the tags worked, though, we feel confident enough to attach the transmitters to males as well, which is what we will do this coming summer."

They also documented that two female kestrels flew to North Carolina and Georgia for the winter and then returned to their breeding territories, a new finding.

Teams are also radio-tracking box turtles every year. They notch each turtle's shell with a unique code to identify individuals and estimate their annual survival and population size. Box turtles have been known to live more than 100 years. Researchers hope to learn what habitats the turtles use, what time of year they're most active, the size of their territories, how much neighboring territories overlap, and how to conserve habitats and turtles. By understanding the turtles' movements in various habitats, they hope to advise landowners on mowing and haying practices that can minimize turtle mortality.

"Many of our projects start when someone asks us advice on what to do on their land," said Eleanor. "We were getting a lot of questions from people about helping kestrels on their land, so we figured we'd do some research to figure out how best to help kestrels. That's our goal—to design research projects that will help both manage our property and also result in concrete advice for landowners."

Clifton's land management outreach associate "gives advice to landowners about how to support native plants and animals on their properties, and she uses a lot of the results from our research in that," Eleanor continued.

Dr. Tom Wood of George Mason

The Clifton Institute Map of the Experimental Grassland Restoration Project



A map of The Clifton Institute's 110-acre grassland restoration experiment. They are comparing the effectiveness of different management strategies to restore native grassland habitats, which also benefits a variety of species of wildlife.

University bands birds in different habitats every 10 days from late spring through summer. Of particular interest are the neotropical migratory birds that breed on the Clifton property. Scientists at 1,200 stations across North America use the data to study the habitats that



Eastern woodland turtles (box turtles) are radio-tracked each year to learn more about them.

different species use, the resources they need, and changes in abundance. This work is part of the nationwide Monitoring Avian Productivity and Survivorship (MAPS) program, coordinated by the Institute for Bird Populations.

In other research, Bert is doing a 20-year study of birds' movement up mountains because some respond to climate change by moving to cooler, higher elevations.

Prioritizing Native Plants

Clifton's research encompasses a wide variety of plant life as well. This spring, with Nature's Notebook, the Harrises will begin a multi-year monitoring of the phenology or seasonality of shrubs flowering. They're looking to see if as plants respond to climate change, the timing of flowering changes.

In September 2022, Clifton, along with Virginia State University (VSU), received a Conservation Innovation Grant (CIG) from the USDA Natural Resources Conservation Service to fund a new program called The Virginia Native Seed Pilot Project. The project seeks to increase pollinator-friendly native wildflowers and grasses for solar

installations, meadows, farms, and roadsides.

The grant will fund a new Native Seed Coordinator position at The Clifton Institute who will work with partners and volunteers to collect seeds of 15 species of wildflowers and grasses across the state. A new greenhouse at The Clifton Institute will also be partly funded by the grant and seedlings will be grown to then be transplanted in farmers' fields. VSU and Clifton Institute staff will work to establish a network of local producers who can serve as a commercial source of native seeds. The project will focus on equipping underserved farmers with the tools and skills they need to grow and sell this new high value crop.

The Virginia Department of Wildlife Resources (DWR) is a partner in the project, along with other organizations. "DWR was a key partner in developing the CIG grant proposal and is providing much to the effort through continuing staff support of the effort," said Stephen Living, DWR's habitat education coordinator.

As part of Clifton's work on researching and restoring native grasslands,



A study looking at how American kestrels use different habitats for hunting can assist landowners looking to help the species.



Volunteers pitch in to help clean seeds for the native plant seed propagation program.

Virginia Tech PhD student Jordan Coscia is studying remnant Piedmont prairies and their plants. She has identified four distinct types of prairies and is working to measure the effectiveness of each experimental treatment in restoring native plants. Her work can also help inform restoration and management of these habitats.

Engaging the Community

This past October, Clifton held a workshop for Fauquier County teachers to help them incorporate field science into their teaching. In plant and insect surveys, teachers analyzed fields that had been burned and mowed. School groups of various levels, from pre-kindergarten to grade 12, visit Clifton to study science and get practical experience in nature.

Younger students explore Clifton's trails and participate in guided hands-on activities, while older students can work on species identifications, learn about geology, and work on projects.

Community volunteers conduct plant, bird, dragonfly, butterfly, and frog egg surveys. Some monitor the 30 blue-bird boxes. Clifton staffers host nature walks, programs, outdoor classrooms,



School trips, summer camps, and guided walks provide outdoor education for children of all ages.

and a summer camp for youngsters, including a "Young Scientist" session that lets children explore and carry out their own research project.

John-Paul Martinez, a father of four, visits the property often. "Having the opportunity to partake in the myriad of

programs that The Clifton Institute has to offer in this amazing setting has become part of our family experience," he said. "Whether we're on a guided hike to learn about the various species of mushrooms or how to identify various species of tree by their bark or even witnessing, from a safe distance, a controlled prescribed burn to help reduce populations of invasive plants and insects and to rejuvenate the area, our family of six can always look forward to a new adventure where we always learn something new."

Eleanor noted that The Clifton Institute's location just southwest of Washington D.C. provides a unique opportunity. "It's a great big piece of land that's under conservation easement, but we're also readily accessible to people who are in or close to a big urban center in D.C.," she said. "It's an accessible, big piece of preserved land where they can come and learn about all the wild things. It's a special place to explore." ❧

Glenda C. Booth, a freelance writer, grew up in Southwest Virginia and has lived in Northern Virginia over 30 years, where she is active in conservation efforts.



Restoring native plants to grasslands is a priority at The Clifton Institute.



The Clifton Institute hosts a number of guided family hikes on the property.

Spring May Be Here, But Remember That The Water Is Still Cold!



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the practice is especially important for anyone on the water fishing, hunting, birding, or just enjoying spring. Weather this time of year is deceptive—the land warms up much faster than the water. It can be sunny enough for a T-shirt ashore, but cold enough to be lethal for anyone who ends up in the water, intentionally or otherwise, for any length of time.

Consider the following definition from the U.S. Coast Guard: “Hypothermia occurs

when your body loses heat faster than it can produce it.” The most common causes of hypothermia are exposure to cold-weather conditions or cold water. But prolonged exposure to any environment colder than your body can lead to hypothermia if you aren’t dressed appropriately or can’t control the conditions. A water temperature of 50°F can lead to death in as little as one hour, and water temperatures near freezing can cause death in as little as 15 minutes. The Coast Guard offers a great 50/50/50 rule to protect against hypothermia: If someone is in 50°F water for 50 minutes, he/she has a 50 percent better chance of survival if wearing a life jacket.

Because water is very good at transferring heat from your body, you lose heat much faster overboard than in cold air. The following tips may increase your survival time in cold water if you accidentally fall in:

✓ **Wear a life jacket.** If you plan to ride in a watercraft, wear a life jacket. A

life jacket can help you stay alive longer in cold water by enabling you to float without using energy and by providing some insulation. Keep a whistle attached to your life jacket to signal for help.

✓ **Get out of the water if possible.** Get out of the water as much as possible, such as climbing onto a capsized boat or grabbing onto a floating object.

✓ **Don’t attempt to swim unless you’re close to safety.** Unless a boat, another person, or a life jacket is close by, stay put. Swimming will use up energy and may shorten survival time.

✓ **Position your body to minimize heat loss.** Use a body position known as the Heat Escape Lessening Posture (HELP) to reduce heat loss while you wait for assistance: Hold your knees to your chest to protect the trunk of your body. If you’re wearing a life jacket that turns your face down in this position, bring your legs tightly together, your arms to your sides, and your head back. Swimming or treading water cools you about 35 percent faster, so remain still if possible.

✓ **Huddle with others.** If you’ve fallen into cold water with other people, keep warm by facing each other in a tight circle.

✓ **Don’t remove your clothing.** While you’re in the water, don’t remove clothing because it helps to insulate you from the water. Buckle, button, and zip up your clothes. Cover your head if possible. Remove clothing only after you’re safely out of the water and can take measures to get dry and warm.

Thirty years ago on a sunny day in early April, a friend who’s a very skillful, experienced waterman fell off the transom of his workboat into broad, open water in a freak accident. He wasn’t wearing a life jacket. His boat was in gear, idling forward at three knots, just fast enough that he couldn’t swim to her. The water temperature was 49°F. Fortunately, he’s a strong swimmer, so he treaded water (and said a few prayers). Thirty minutes later, friends saw the boat without her skipper, but it took them an hour and a half more to find him, a tiny needle in a very big, watery haystack. He was seriously hypothermic, minutes away from immobility and unconsciousness. Thankfully, they got him to a local hospital, whose staff carefully re-warmed him enough to go home the next day, but if the searchers had come 10 minutes later, he might have been gone.

Conclusion #1 from this cautionary tale: Wear a life jacket! We highly recommend it for all Virginia boaters, but

In more than 40 years at the Chesapeake Bay Foundation, Virginia native John Page Williams championed the Bay’s causes and educated countless people about its history and biology.

PHOTO TIPS

Column and photo
by Lynda Richardson



Night of the Spring Peepers

One March evening, I was part of a group of six who traveled to a vernal pool along the James River. The air was damp and cold, and we were on a mission to find and count spotted salamanders, which, hopefully, were beginning to arrive at this spot to breed.

The light from our headlamps and flashlights bounced across the dark landscape, and as we got closer, familiar songs began to fill the air... peeeeeep...peeeeeep...peeeeeep!

At the vernal pool the calls were deafening. We spread out and swept our lights across the water, looking for salamanders. As we searched, each person yelled out their report. Sadly, "no salamanders," was the song we sung.

Our loud observations disturbed the deafening orchestra engulfing us. When someone yelled out, a sudden silence would fall over the pool, only to restart minutes later. We quietly regrouped and decided to look for the singers, tiny frogs called spring peepers.

In late winter, when salamanders return to their natal pools to breed, also-amorous spring peepers are already singing their songs of love. "Peepers" are well-camouflaged and found in various shades of tan with a distinctive hour-glass X marking on their backs. Growing to nearly 1½ inches, these amphibians are known to be one of the first frog singers of the year.

At first, we were so focused on spotted salamanders that we completely missed seeing the tiny peepers, but once we dialed into them, they were



everywhere! Light shines didn't seem to disturb them, but if you spoke too loudly or broke a branch underfoot, they would go silent, returning to song a few minutes later.

Our sweeping lights picked up peepers perched on rocks, sticks, sides of trees, at the water's edge, everywhere. I shined my headlamp around the pool looking for one in a pleasing setting.

Once I found it, I knelt to prepare some test shots to get an exposure that I liked. Always remember that when making test shots, you should shoot at the same lens length, distance from the subject, and subject size to get the most consistent exposures. Flash output is based on the distance from your subject and the length of time the flash sends out light, not the power of the light. By keeping your tests roughly the same, you will get better results. (Less post-processing too!)

Using a Canon EOS 7D Mark II DSLR camera, Canon EF24-105mm f/4 IS lens, and Canon EOS 580 flash, I turned to the opposite direction of my

subject and shot a few frames starting with ISO 400, 1/60, f/8.0 with flash output set to 0. After reviewing the test images, I lowered my shutter speed to 1/30 so I could get more light on the background and opened up the aperture to f/7.1, allowing additional light on my subject, and lowered the flash output to 1/3. Once satisfied, I turned back to my subject and shined my headlamp on the peeper so I could focus and compose the shot. I then

shot a frame and checked the exposure again. It looked good! So I began my photo shoot, timing the shutter releases to capture his fully air-filled vocal sack. He posed handsomely, singing his little heart out, seemingly undisturbed.

Besides making test shots beforehand, a secret to success in photographing spring peepers, or any frogs or salamanders for that matter, at night is to have a light source, such as a headlamp, that allows for hands-free camera control. With a lamp on your head or attached to a tripod or tree, you can aim it on your subject and then have your hands free to make any camera adjustments.

This March, challenge yourself to go outside on a cold, damp evening and try your hand at photographing the spring peepers' annual tradition. Wear a headlamp, bring a camera and flash, and head out into the loudest swamp you can find!

Lynda Richardson is the art director of this magazine and loves looking for frogs at night.

Don't Pick Your Poison: Water Hemlock



A Walk in the Woods

Column and photos
by Mike Roberts



As a child, I had a great disdain for carrots! Over time, however, my tastebuds became more receptive to the root vegetable's flavor. Served raw or steamed, these veggies are loaded with nutrients that promote quality health and reduce the risks of cancer and heart conditions. Orange carrots are rich in beta-carotene, which is responsible for the coloration; the human body converts these antioxidants into Vitamin A vital to eye health.

The carrots we grow in our gardens and purchase in grocery stores are derivatives of the wild carrot (*Daucus carota*), a plant indigenous to Europe, which eventually spread to the New World. Practically everyone knows the wild carrot as Queen Anne's lace—a common plant displaying crowns of small, white flowers across Virginia's hillsides during summer. What's more, the leaves, seeds, and blossoms of wild carrots are edible.

The carrot family, Apiaceae, includes more than 3,000 species worldwide, some of which are native to the commonwealth. Outdoor enthusiasts should familiarize themselves with these plants, because several species are extremely toxic and should be avoided. Cow parsnip, wild parsnip, and giant hogweed contain phototoxins that are activated by the sun's ultraviolet rays. If the sap of these plants come in direct contact with human skin, it causes



irritations ranging from mild rashes to severe blistering and tissue scarring.

And while the aforementioned plants pose a potential threat to humans, there remains another species in the carrot family that is recognized as being the most lethal in the Northern Hemisphere—water hemlock (*Cicuta douglasii*). Water hemlock is closely related to the Old World species poison hemlock, which the Greek philosopher Socrates was forced to drink in 399 BC as punishment for corrupting the minds of young Athenians.

Water hemlock grows throughout Virginia and, true to its name, is found around ponds and lakes, wet meadows, stream banks, and drain ditches. Although the leaves sprout during early spring, the plant does not flower until June or July; the flowering umbels are similar in appearance to those of other members of the carrot family. The foliage, however, is key to its identification. Water hemlock leaves are sharply toothed and alternately arranged, as are those of other species. The difference

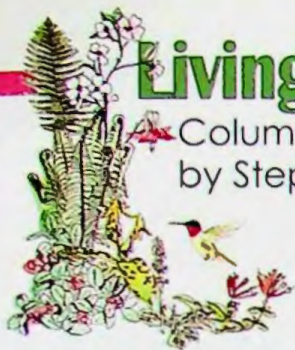


being that the leaf veins end between the serrations, not at the serrated tips.

Parts of the water hemlock contain a deadly unsaturated alcohol, cicutoxin. It is found principally in the tubers, but is also present in the leaves and stems during early growth. Leaves and stems lose most of their toxicity as they mature; however, green seed heads are poisonous. Poisoning ranges from seizures and convulsions to death. Even contact with the skin is a concern, because the cicutoxins can be absorbed through the epidermis. Death, from respiratory failure, can occur as soon as 15 minutes after ingestion. And for the record, the tuberous roots and green seed heads are lethal to livestock!

Next summer, keep an eye out for those tall stalks decorated with white crowns of flowers growing along wetland margins; just remember not to touch them!

A lifelong naturalist and wildlife photographer, Mike Roberts enjoys sharing his knowledge with others. You can contact him at: return2nature@aol.com.



Living Habitats

Column and photo
by Stephen Living

The Importance of Vernal Pools

If you've ever taken a walk in the woods and been surprised to hear the calling of frogs and toads far from any obvious bodies of water, you may have stumbled on a special kind of wetland commonly called a vernal pool. Vernal refers to spring, but these wetlands fill with rainwater, snowmelt, or groundwater during wet periods and may dry completely during warm summer months. Describing them as seasonal wetlands is probably more accurate. While these ponds may be found in complexes or groups, they are isolated from larger water features like streams and lakes. The isolated nature of these pools and the fact that they periodically dry up creates habitat for a unique group of plant and wildlife species.

Because these ponds are isolated and temporary, there aren't any fish. This makes them a perfect spot for salamanders and frogs to breed with less risk of predation to their eggs and larva. Seven species of amphibians in Virginia require these seasonal pools to reproduce: spotted salamanders, marbled salamander, tiger salamander (state endangered), Jefferson salamander, Mabee's salamander (state threatened), mole salamander, and wood frogs.

Four of these species are listed as Species of Greatest Conservation Need (SGCN) in Virginia's Wildlife Action Plan. Also found only in vernal pools are the whimsically named (and upside-down swimming) fairy shrimp. Unique plants can also be found in and around these pools. Harpers fimbry (a small sedge) and pond spice are globally rare plants associated only with these wetlands in Virginia.

Seasonal pools can be found across



Virginia in a variety of habitats from pine savannas, forest, and even meadows. In addition to supporting many rare species, vernal pools are a key habitat resource for many other animals and plants. Frogs and toads will use these ponds as well as reptiles like plain-bellied water snakes and spotted turtles. Herons will hunt the margins of a pond, and wood ducks can be found floating on their water. Dragonflies and damselflies lay their eggs in these ponds. Ponds shaded by forest canopy may have relatively little vegetation, while those open to sun can support a wide variety of plants like spotted jewelweed and buttonbush.

As these ponds may be the only significant water body in their patch of habitat, they become important watering holes, especially during the heat of summer. The tracks of deer, raccoon, fox, and many other species of wildlife can be found along the muddy edges.

These small wetlands are habitat powerhouses, providing for a variety of

both rare and common species. Unfortunately, the importance of these small pools has not always been understood. This, combined with their relatively small size, has meant that many have been destroyed or degraded. The habitat that surrounds these pools is also important both as a buffer to protect the wetland and as year-round habitat for the wildlife that use the pools to breed.

Even a small water feature in your yard can provide valuable habitat for amphibians and other wildlife. If you decide to add a water feature, don't add fish to if you want to attract amphibians. Fish will quickly eat the eggs and larva. Think about the rest of your habitat as well. Reduce pesticide use as amphibians can be susceptible to pollution. Use plants that are native to Virginia to provide cover in and around the pond. Avoid invasive species like yellow iris, or water hyacinth. Leaf litter, snags, or downed logs can also provide needed hiding places.

► For more information about adding water to your Habitat at Home check out virginiawildlife.gov/wildlife/habitat/aquatic/

► Interesting in seeing these cool ponds for yourself? One of the best examples can be found at the Grafton Ponds Natural Area Preserve in York County. These wetlands can also be found on many of the Virginia Department of Wildlife Resource's Wildlife Management Areas (WMAs).

Stephen Living, the DWR habitat education coordinator, is a biologist and naturalist with a lifelong love of wildlife and nature that began in the woods and streams of his childhood.



Catfish has been a staple in Southern cuisines since the Native Americans first prepared them centuries ago. Non-native freshwater blue catfish are one of several species found in Virginia. They eat almost anything and are considered an invasive species in the Chesapeake Bay watershed. Adult blue catfish are not bottom feeders, so they don't taste muddy like other catfish species. A 4- to 5-pounder yields two fillets perfectly sized for individual portions. Their white flesh cooks up flaky with a mild flavor that works well with a variety of seasonings. Using a no-salt blackening blend lets me control the saltiness, but if you have a favorite, use it! Don't skip the gremolata—it rounds out the flavors with a lemony, herbal brightness.

Blackened Catfish with Cornmeal Waffles

Yield: 4 main course servings

Blackened Catfish

1 lb. catfish fillets (about four large)
Kosher salt
Extra virgin olive oil
Your favorite salt-free blackening seasoning
1 Tbsp. unsalted butter

Pat fillets dry and sprinkle lightly with Kosher salt on both sides; let stand 15 minutes. Drizzle both sides lightly with olive oil, then lightly but thoroughly coat just the top side with blackened seasoning, gently rubbing into the entire surface. Preheat a large cast iron skillet over high heat. Add butter and rotate pan so butter melts quickly and evenly without burning, then immediately add the fillets, seasoned side down, and cook one to two minutes or until spices turn dark brown. Flip fillets and cook until fish flakes easily with a fork, another one to two minutes, adjusting cooking time depending on thickness of the fillets. Transfer fillets to a plate to prevent additional cooking and cover loosely with foil until ready to serve.

Cornmeal Waffles

Makes four 4" square waffles

$\frac{3}{4}$ c. all-purpose flour
 $\frac{1}{2}$ c. plus 1 Tbsp. medium grind cornmeal
 $\frac{1}{2}$ tsp. salt
1 tsp. baking powder
 $\frac{1}{2}$ tsp. baking soda
1 Tbsp. granulated sugar
1 $\frac{1}{4}$ c. full-fat buttermilk
1 egg, beaten
2 $\frac{1}{2}$ Tbsp. melted butter

In a medium bowl, combine flour, cornmeal, salt, baking powder, baking soda, and sugar. In another medium bowl, whisk together the buttermilk, eggs, and butter. Add the wet ingredients to the dry and beat briefly to combine (some small lumps are okay). Let stand five minutes. Heat a waffle iron, add batter to hot iron, and cook until golden brown and crisp. To keep waffles hot until serving, put on a baking sheet in a preheated oven at 225°F for 15 to 20 minutes.

Peppercorn Cream Sauce

2 c. heavy cream
 $\frac{3}{4}$ tsp. coarsely crushed red and green peppercorns
Kosher salt

In a medium saucepan over medium-low heat, bring cream to a gentle simmer. Reduce heat to keep at a simmer and let reduce by almost half (to 1 $\frac{1}{4}$ cups, about 15 to 20 minutes), watching to make sure it does not scorch. Stir in peppercorns and a pinch of salt and simmer five minutes.

Gremolata

$\frac{1}{2}$ tsp. fresh garlic, very finely minced
 $\frac{1}{4}$ c. finely chopped fresh parsley
2 tsp. finely chopped lemon zest
4 tsp. lemon juice
4 tsp. extra virgin olive oil
Pinch salt and black pepper

Combine all ingredients thoroughly and refrigerate until ready to use.

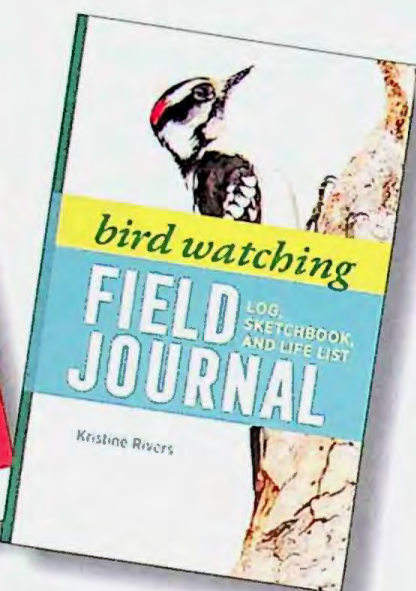
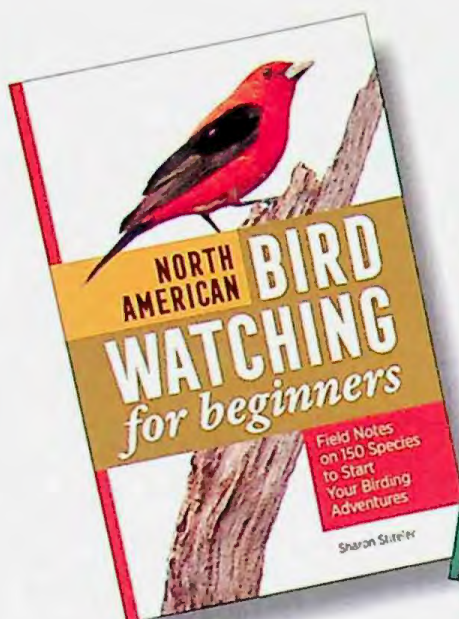
To serve, divide waffles among four plates, top each with a fish fillet, pour warm sauce over fish, and divide the gremolata evenly over each portion.

Wendy Hyde lives on the Northern Neck of Virginia with her husband and two dogs. Her recipes have been featured in Chesapeake Style magazine. Find her on Instagram @girlgamechef.



GOOD READS

by Beth Hester



North American Bird Watching for Beginners: Field Notes on 150 Species to Start Your Birding Adventures
by Sharon Stiteler

Birdwatching Field Journal: Log, Sketchbook, and Life List
by Kristine Rivers
2022 Rockridge Press, an imprint of Callisto Media, Color Photographs, callistomedia.com

"Birding can be done by anyone, at any time of year, and at any age, even in the busiest cities. You will be engaging in an activity that constantly teaches you something new about nature, occasionally frustrates you with its taxonomy rules and changes, and always wows you with its beauty." - the author

Affordable and accessible, *North American Bird Watching for Beginners: Field Notes on 150 Species to Start Your Birding Adventures* is a birding field guide that's a great choice for the novice birdwatcher. Focused

solely on 150 of the most commonly encountered species, and divided into sections covering backyard and park birds, waterbirds, and raptors, it's thorough enough to make identification a snap, yet the stripped-down simplicity of each page's visual elements make it easy for users to focus on the essentials. Entertaining and often cheeky descriptions of each bird's physical appearance and range ramp up the laugh-out-loud enjoyment factor. When describing the distribution of the Canada goose, Stiteler writes: "Range: Everywhere. They could be inside your house right now." Irresistible, and funny because it's true.

A wonderful introductory section sets the beginning birder up for success, and includes brief introductions to taxonomy, habitat, bird behavior, migration patterns, birding equipment, and field etiquette. Included are tips on sharing findings and sightings via the eBird platform and ways to connect with other birders to augment solo explorations.

The Bird Watching Field Journal: Log, Sketchbook, and Life List, from the same publisher, includes an explanation

of how keeping a "life list" can add to the pleasure of birding, and the format encourages the documentation of sightings through simple, fillable forms and dedicated white space designed to accommodate sketches or additional notes.

Together, these compact and affordable volumes offer the rookie birder an on-ramp to a rewarding pastime that can last a lifetime.

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Keep Up With Wildlife Cams!

The Department of Wildlife Resources (DWR) has three live-streaming cameras operating this spring.



Falcon Cam

virginiawildlife.gov/falcon-cam/

Falcon cam, which features video and audio, follows the breeding season of a peregrine falcon pair that nests in downtown Richmond, Virginia.



Shad Cam

virginiawildlife.gov/shad-cam/

A camera at the Boshers Dam fishway on the James River provides visitors a peek into the incredible journey as fish such as American shad, gizzard shad, sea lamprey, and more return to spawn in the spring.



Marsh Cam

virginiawildlife.gov/marsh-cam/

This camera is located on the southern end of Hog Island Wildlife Management Area (WMA), centered between a tidal marsh and two managed impoundments. It remains in operation 24/7, every day of the year, which means that night or day, no matter the season, there is always something to see!

PICS FROM THE FIELD



Congratulations to Erin Lahan of Afton for this delightful photograph of a red eft, the terrestrial stage of an Eastern red-spotted newt.

Erin captured this image while exploring Shenandoah National Park in late 2021. Thank you for sharing, Erin!

You are invited to submit up to three of your best photographs for possible publication in *Pics from the Field*. Please include contact information (email and phone number, city or county you live in) and send only high-resolution (minimum size, 4"x6" at 300ppi) jpeg, tiff, or raw files via email attachment or WeTransfer to: Lynda.richardson@dwr.virginia.gov. We look forward to seeing and sharing your best work! HAPPY SHOOTING!

UPCOMING EVENTS



March 11

National Archery in the Schools Program (NASP) State Tournament

nasptournaments.org

April 1



Trout Heritage Day

virginiawildlife.gov/fishing/trout/trout-heritage-day/



April 1-2

Youth and Apprentice Spring Turkey Hunting Weekend

virginiawildlife.gov/hunting/regulations/turkey/#youth-spring

April 5-9



National Wildlife Week

nationalwildlifeweek.nwf.org/



April 8 - May 13

Spring Turkey Hunting Season

virginiawildlife.gov/hunting/spring-turkey-hunting-in-virginia/

April 15

Virginia Osprey Festival

virginiaospreyfestival.org/



April 22

Earth Day

earthday.org/

Choose Erosion Control Blankets Wisely

Erosion control blankets (ECB) are often used in landscaping and other construction activities to control soil erosion and allow grass or other ground cover to grow. These products are made of various materials, including plastic and nylon. Unfortunately, ECBs made from these synthetic products have been well documented to entangle and kill wildlife, particularly snakes. So well in fact, that they are sometimes specifically promoted as an effective product in controlling snakes around residential properties and bird houses. However, these products are also known to entangle and kill other wildlife including birds, frogs, and even turtles.

Although synthetic ECBs are marketed as being photodegradable when exposed to the sun, they can continue to entangle and kill wildlife years after project completion. This problem can be compounded when these products are used in shaded, forested areas or when the grass or ground cover becomes tall enough that it shades the matting, thus preventing or slowing the photodegradation process. What the Virginia Department of Wildlife Resources (DWR) and other conservation organizations recommend is the use of coconut fiber-based products. Commonly referred to on the market as coir mats, the loose-weave, non-welded, movable-joint netting is more flexible and has been shown to be "wildlife friendly." For more information on these products visit:

fws.gov/initiative/protecting-wildlife/make-change-wildlife-friendly-erosion-control-products



Lynda Richardson/DWR

A black racer that had become entangled in synthetic netting while hunting along the edge of a koi pond. This snake was cut out and released.



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virginiawildlife.gov/shop

Meghan Marchetti/DWR

BEING BEARWISE



Black bears are found almost everywhere throughout Virginia, so it is common for people to live, work, and play in bear country. It is incredibly important for people to learn the facts about black bears and to know what they can do to prevent conflicts. In this way, we can make sure we keep bears wild and coexist in this beautiful state for generations to come.

Bears are attracted to food sources in residential areas. But with some simple steps, you can reduce the chances of making bears repeated visitors to your neighborhood or property.

- Secure your garbage in bear-resistant trash cans or store it in a secure building.
- Keep your grill clean
- Remove bird feeders from April to November
- Don't put meat scraps in your compost pile
- Don't leave pet food outdoors
- Secure livestock/chicken feed
- Protect beehives with electric fencing
- Pick up and remove ripe fruit from fruit trees
- Talk to your neighbors and share these recommendations.

After a few failed attempts to find food around homes, bears will usually leave the area in search of natural wild foods. If necessary, DWR can help you identify additional attractants that you may have on your property.

Find more information about being BearWise:

virginiawildlife.gov/wildlife/bear/living-with-black-bears/

If you have any additional questions, contact the Wildlife Conflict Helpline at (855) 571-9003.





Virginia Department of
Wildlife Resources
P.O. Box 90778
Henrico, Virginia 23228



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